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Standard PCS 7 Water Templates for the Water Industry

SIMATIC PCS 7 V9.0 SP2 / PCS 7 APL V9.0 SP3 / PCS 7 Industry Library V9.0 Upd1/ SITRANS Library V9.2 / PCS 7 Power Control Library

https://support.industry.siemens.com/cs/ww/en/view/78604785

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1 Overview of the PCS 7 Water Templates

1.1 Use

The use of standard PCS 7 Water Templates focuses on the focal points of the water industry with municipal or private plant operators for:

- Drinking water
- Wastewater
- Desalination
- Water transport (pipelines, water distribution)

These standardized PCS 7 Water Templates can also be used in the following areas:

- Irrigation
- Pumping stations
- Wastewater services
- Industrial water
- Water purification
- Dams
- Weirs
- Waterways/locks
- Dyke systems/flood protection
- Other branches

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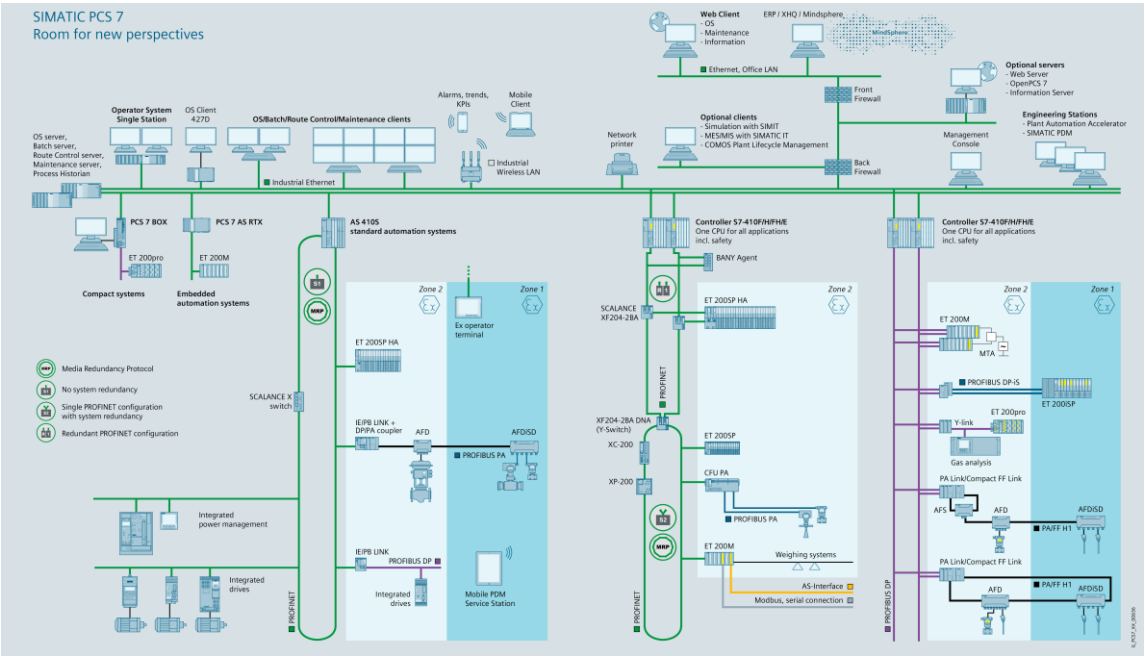
1.2 Requirements

The water industry is closely connected to our environment. In addition to process engineering, it also sets technical, economic and environmental requirements.

Cost reduction in planning, engineering, maintenance and repair times, as well as employee training are just as much a part of this as the total costs of all investments incurred over the entire life cycle (Total Cost of Ownership = TCO).

The technical requirements focus on scalable solutions with SIMATIC S7-300/ S7-400 hardware, tailor-made from the smallest plant to complex large-scale plants. High availability must always be guaranteed at all levels (plant management, operation and monitoring, automation, field and process levels). This also includes the problem-free integration of process instrumentation, power distribution, drive solutions such as engines, gate valves, valves and frequency converters.

Figure 1-1



In particular, the connection of decentralized structures such as pumping stations, sewer networks, water reservoirs and storage channels via telecontrol is another important aspect within the framework of technical requirements in the water industry.

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1.3 System requirement

The PCS 7 Water Templates are based on the following components, some are subject to licensing:

- SIMATIC PCS 7 Advanced Process Library (APL)
- SIMATIC PCS 7 Add-On Industry Library (IL)
- SIMATIC PCS 7 Add-On Power Control APL Library (PC)
- SITRANS Library (SL) – Free
- SITOP Library – Free
- SIMATIC Modbus/TCP

The use in your configuration environment or in process operation obliges you to purchase the engineering and runtime licenses for the Industry Library, possibly also for the Power Control add-on, if these blocks and functions are used.

The SITRANS Library and the SITOP Library are available free of charge in the Online Support.

Commissioning of Modbus/TCP, SIMOCODE pro V- or SINAMICS devices require the engineering license SIMOCODE ES V14.1 (TIA Portal) or the STARTER license.

In the following table you will find the links to the ordering information or the free downloads of the products used:

Table 1-1

Product	Link
PCS 7 Industry Library (IL)	https://support.industry.siemens.com/cs/ww/en/view/109750720
PCS 7 Power Control (PC)	https://support.industry.siemens.com/cs/ww/en/view/109759919
PCS 7 SITRANS Library (SL)	https://support.industry.siemens.com/cs/ww/en/view/65741624 Free
PCS 7 SITOP Library	https://support.industry.siemens.com/cs/ww/en/view/109476154 Free
SIMOCODE ES V14.1 (TIA Portal)	https://support.industry.siemens.com/cs/ww/en/view/28368485
STARTER	https://support.industry.siemens.com/cs/ww/en/view/109757244
Modbus/TCP	https://mall.industry.siemens.com/mall/en/WW/Catalog/Products/10165502

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1.4 Concept structure

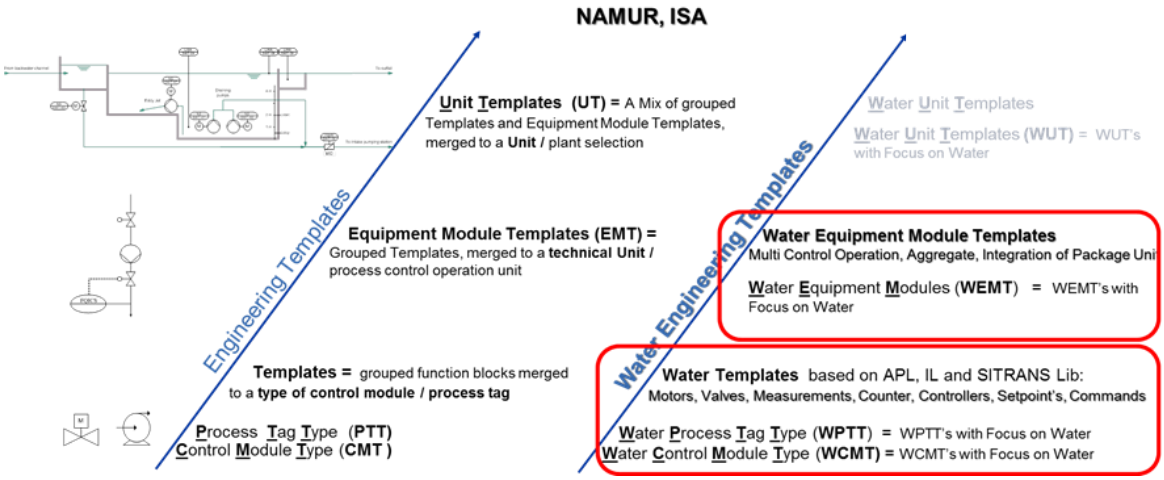
1.4.1 Standardized engineering templates in process control

The use of standardized engineering templates increases the economic benefit in project engineering, for example in:

- Cost reduction for application development and basic engineering
- Standardization through unified program structures
- Safe operation and monitoring with uniform look & feel
- Life cycle guarantee with short maintenance and servicing times

Engineering **T**emplates are based on the physical model of the standards NAMUR NE33 and ISA S88.01 (ANSI/ISA-88.01-1995) and designed as follows:

Fig. 1-2


NAMUR, ISA
Unit Templates (UT) = A Mix of grouped Templates and Equipment Module Templates, merged to a Unit / plant selection
Water Unit Templates
Water Unit Templates (WUT) = WUT's with Focus on Water
Engineering Templates
Equipment Module Templates (EMT) = Grouped Templates, merged to a technical Unit / process control operation unit
Water Engineering Templates
Water Equipment Module Templates
Multi Control Operation, Aggregate, Integration of Package Uni
Water Equipment Modules (WEMT) = WEMT's with Focus on Water
Templates = grouped function blocks merged to a type of control module / process tag
Water Templates based on APL, IL and SITRANS Lib:
Motors, Valves, Measurements, Counter, Controllers, Setpoint's, Commands
Process Tag Type (PTT)
Control Module Type (CMT)
Water Process Tag Type (WPTT) = WPTT's with Focus on Water
Water Control Module Type (WCMT) = WCMT's with Focus on Water

Templates

Templates consist of clustered function blocks typified as:

- Process Tag Type (PTT)
- Single control unit types = Control Module Type (CMT)

and contain:

- Input/output signals
- Technological functions (e.g. engine)
- Panel and local controls
- Monitoring functions and recording of operating hours.

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Equipment module templates

Equipment Module Templates consist of clustered templates of various types, which are grouped into a technical equipment / process control operation unit, e.g. multi-user control, 8/16 aggregate switching, Package Units, dosing control.

Unit Templates

Unit Templates consist of templates and Equipment Module Templates with hierarchical structures, which are connected to a *plant section* (e.g. storage channel).

Process Cell, Area, Site, Enterprise

Further components of the physical model taken from ISA -88.01, such as Process Cell (higher-level plant unit), Area (production plant), site (plant) and Enterprise (company) are not considered in this document.

1.4.2 Water Engineering Templates in the water industry

In the water industry, Engineering Templates are ideally used with water-specific functionalities and industry-specific properties. These Water Templates consist of three groups:

Water Templates

Table 1-2

Abbreviation	Explanation of term
WPTT	**W**ater **P**rocess **T**ag **T**ype water-specific process tag type
WCMT	**W**ater **C**ontrol **M**odule **T**ype A water-specific control module type

Water Equipment Modules

Table 1-3

Abbreviation	Explanation of term
WEMT	**W**ater **E**quipment **M**odule **T**ype Water-specific devices / process control operation unit

Water Unit Template (WUT)

Table 1-4

Abbreviation	Explanation of term
WUT	**W**ater **U**nit **T**ype A water-specific plant unit

Note This document describes primarily the design and use of PCS 7 Water Control Module Types. In the following descriptions, the term "PCS 7 Water Template(s)" is primarily used.

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1.4.3 Definition of "water-specific"

The term "water-specific" considers the legal requirements and guidelines for water or wastewater treatment plant operators, which have to be adhered to in their construction, operation, maintenance and care.
The most important water-specific requirement is to ensure plant operation in case of partial/complete failure of the process control, remote data and/or automation technology.

Standardized solutions are available in the PCS 7 Water Templates with CPU 410/400 hardware for this and other requirements:

- Simple multi-user control 1 out of 8 control locations
- Integrated Panel operation (optional mosaic panel connection)
- Integrated local controls (HW) **without** automation (AS)
- Integrated local controls (SW) **with** automation
- Unit switchover for 8/16 drives
- 96 turning points with 15 minutes setpoint curve specifications
- Configurable and controllable polygon with 8 turning points
- Monitoring of measured values with up to 8 limit values
- Time-driven controller for simple process operations
- Simple integration of Package Units solutions with S7-300 / IM151-8 / S7-1500 / S7-410S / S7-410H in process control technology
- Example drive solutions for AUMA © actuators via PROFIBUS connection
- Complete drive solutions (pumps, agitators, etc.) via PROFIBUS DP/PROFINET with SIMOCODE pro V (incl. HW engineering)
- Complete drive solutions (dosing pumps, blowers, etc.) with SINAMICS G120P/X with or without field bus connection (incl. HW engineering)
- Integrated solution with SITRANS F, SITRANS L, SITRANS P and SITRANS T process instrument solutions with or without field bus connection (PROFIBUS DP/PA)
- Integrated solution for SITOP 24V DC monitoring with or without field bus connection (PROFINET).
- Integrated energy technology solutions for low-voltage and medium-voltage distribution systems compliant with IEC 61850 with or without field bus connection (PROFIBUS/PROFINET).

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1.4.4 Water-specific process tag types

A water-specific process tag type (WPTT) is a template of project-specific interconnections of CFC blocks. It is based primarily on the PCS 7 APL, the PCS 7 IL and the PCS 7 Power Control Library. A WPPT can also contain function blocks from the SITRANS Library and/or the SITOP Library.
The process tag types can be edited in PCS 7 with the PCS 7 Plant Automation Accelerator/COMOS.

Note From SIMATIC PCS 7 V8.2 onwards, the WPTTs are omitted, to be fully replaced by WCMTs.

1.4.5 Water-specific control module types

The control module types (WCMTs) are flexible process tag types with particular advantages for variant creation, connection to sub control modules, in synchronization of types and in measurement data engineering with COMOS or with PCS 7 Plant Automation Accelerator (PAA):

- Instance-specific changes to the instance of the control module are not lost during synchronization between type and instance.
- It is also possible to create different instances from a single control module type. In addition to this, optional blocks are also configured in WCMT. Before creating the instances, it is possible to determine in COMOS/PCS 7 Plant Automation Accelerator whether to activate the optional blocks in the corresponding instance. For this purpose, the additional view "Technological Connections" has been introduced in the CFC Editor from PCS 7 V8.0 SP2 Upd 9 onwards.

It is stored as a central technology object in a PCS 7 master data library and consists of:

- a CFC chart
- a PCS 7 OS block icon
- a PCS 7 APL faceplate.

The WCMTs are preset to the essential water-specific functions and can be adapted to the operational requirements by the user within the master data library at any time, project specifically. The Water Templates do not lose their standardization character.

1.4.6 Water-specific Equipment Module Types

Water Specific Equipment Modules Types (WEMT) are technical units which can be composed of controls, valves, sensors, devices/actuators and/or mechanical components. The individual WEMTs are grouped from various PCS 7 Water Templates (WCMT) or consist of separate control system operation units. The WEMTs for control system operations (e.g. multi-user selection, aggregate switching, Package Unit connection) are stored as CFCs. Feedback controls, such as the split-range controls, are created in the form of a sample solution.

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WEMTs are stored in a PCS 7 master data library, consisting of:

- a CFC chart
- a PCS 7 OS block icon
- a PCS 7 APL faceplate.

Processing via mass data engineering can also be done with COMOS/PCS 7 Plant Automation Accelerator.

All PCS 7 Water Templates can only be used in conjunction with the standard PCS 7 hardware components. We recommend efficient measurement data engineering combined with the PCS 7 Water Templates in COMOS/PCS 7 Automation Base ("Integrated Engineering").

1.4.7 Water-specific Unit Template (WUT)

Water-specific unit templates are available for technical subsystems on the basis of standardization. They are made up of the APL standard libraries, Industry Library and SITRANS Library, WCMTs as well as WEMTs.

You can find the following ready-made Unit Templates for the water industry:

Table 1-5

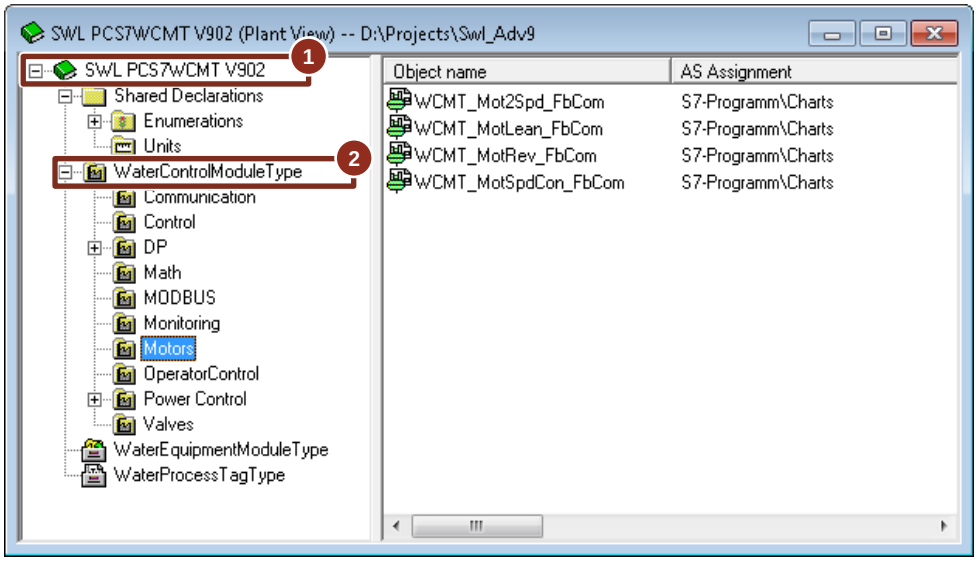
No	PCS 7 Water Unit Template
/1/	Control of Biological Stage of a Wastewater Treatment Plant with Upstream Denitrification: https://support.industry.siemens.com/cs/ww/en/view/109478073
/2/	Control of Biological Stage of a Wastewater Treatment Plant with Intermittent Operation: https://support.industry.siemens.com/cs/ww/en/view/109485916
/3/	External Pump Station of a Wastewater Treatment Plant: https://support.industry.siemens.com/cs/ww/en/view/109481486
/4/	Efficient Management of Storm Water Tank https://support.industry.siemens.com/cs/ww/en/view/109481487

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1.4.8 Structure of the PCS 7 Water Templates

The PCS 7 Water Templates are collected in the PCS 7 library "SWL PCS7WCMT V901". In the plant view, the water-specific CMTs are structured hierarchically as follows:

Figure 1-3



(1) Library

(2) Water-specific control module types (WCMT)

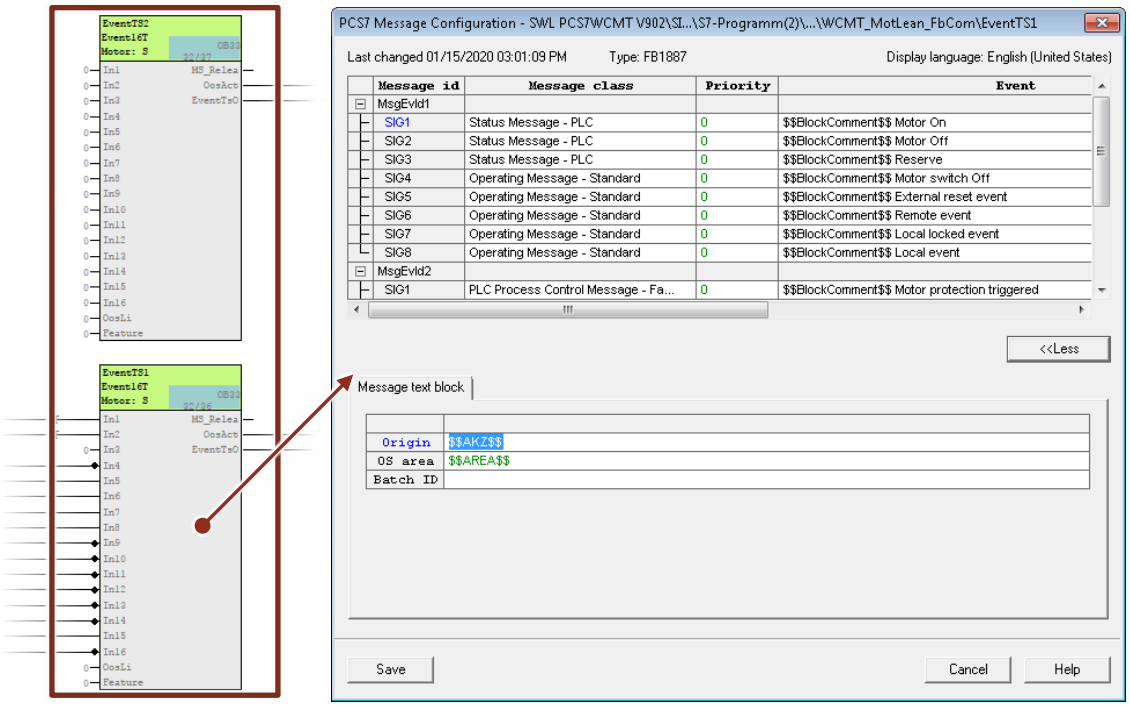
The classification of the PCS 7 Water Templates is based on the standardized PCS 7 library structures.

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1.4.9 Messaging in Water Templates

A unified messaging procedure with predefined message texts has been implemented in the Water Templates

Figure 1-4


EventTS2
Event16T
Motor: S
EventTS1
Event16T
Motor: S
PCS7 Message Configuration - SWL PCS7WCMT V902\SI...\S7-Programm(2)\...\WCMT_MotLean_FbCom\EventTS1
Last changed 01/15/2020 03:01:09 PM
Type: FB1887
Display language: English (United States)
Message id
Message class
Priority
Event
MsgEvId1
SIG1 Status Message - PLC 0 $$BlockComment$$ Motor On
SIG2 Status Message - PLC 0 $$BlockComment$$ Motor Off
SIG3 Status Message - PLC 0 $$BlockComment$$ Reserve
SIG4 Operating Message - Standard 0 $$BlockComment$$ Motor switch Off
SIG5 Operating Message - Standard 0 $$BlockComment$$ External reset event
SIG6 Operating Message - Standard 0 $$BlockComment$$ Remote event
SIG7 Operating Message - Standard 0 $$BlockComment$$ Local locked event
SIG8 Operating Message - Standard 0 $$BlockComment$$ Local event
MsgEvId2
SIG1 PLC Process Control Message - Fa... 0 $$BlockComment$$ Motor protection triggered
<<Less
Message text block
Origin $$AKZ$$
OS area $$AREA$$
Batch ID
Save
Cancel
Help

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Motor controls

The following messaging applies to the MotLean, MotRev, Mot2Spd, MotSpdC templates:

Table 1-6

Bit	EventTS1	Message class	Prio-rity	Info text	Acknowledge-ment
1	Motor on (right)	Status message - AS[1]	0		○
2	Motor off	Status message - AS[1]	0		○
3	Motor off (left)	Status message - AS[1]	0		○
4	Repair switch off	Status message - AS[1]	0		○
5	External reset	Status message - AS[1]	0		○
6	Operating mode preselection: remote	General operation message	0		○
7	Operating mode preselection Off/Zero/Blocked	General operation message	0		○
8	Operating mode preselection: local	General operation message	0		○
9	Engine protection triggered	AS process control system alarm message	0		●
10	Control fuse triggered	AS process control system alarm message	0		●
11	Temperature rise / thermistor protection triggered	AS process control system alarm message	0		●
12	Mechanical protection	AS process control system alarm message	0		●
13	Dry-run protection triggered	AS process control system alarm message	0		●
14	Differential pressure/membrane monitoring triggered	AS process control system alarm message	0		○
15	Bypass active	Process message with acknowledgment	0		○
16	Emergency stop/Stop	AS process control system alarm message	0		○

○ without message acknowledgement

● with message acknowledgement

Message block "EventTS2" enables an optional plant-oriented expansion of the possible messages. Inputs 1-8 are for operation messages that do not need to be acknowledged, while inputs 9-16 are for alarm messages that do have to be acknowledged. Message block "EventTS2" deactivated by default, in order to save CPU storage space and process objects.

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Slide/flap/valve controls

The following messaging applies to the VlvL, VlvMotL, VlvAnalog, VlvPosL templates:

Table 1-7

Bit	EventTS1	Message class	Prio-rity	Info text	Acknowledge-ment
1	Slider/flap/valve open	Status message - AS[1]	0		○
2	Slider/flap/valve Stop	Status message - AS[1] above	0		○
3	Slider/flap/valve closed	Status message - AS[1]	0		○
4	Repair switch off	Status message - AS[1]	0		○
5	External reset	Status message - AS[1]	0		○
6	Operating mode preselection: remote	General operation message	0		○
7	Operating mode preselection Off/Zero/Blocked	General operation message	0		○
8	Operating mode preselection: local	General operation message	0		○
9	Engine protection triggered	AS process control system alarm message	0		●
10	Control fuse triggered	AS process control system alarm message	0		●
11	Temperature rise / thermistor protection triggered	AS process control system alarm message	0		●
12	Torque open triggered	AS process control system alarm message	0		○
13	Torque closed triggered	AS process control system alarm message	0		○
14	Differential pressure/membrane monitoring triggered	AS process control system alarm message	0		○
15	Bypass active	Process message with acknowledgment	0		○
16	Emergency stop/Stop	AS process control system alarm message	0		○

○ without message acknowledgement

● with message acknowledgement

[1] As of SIMATIC PCS 7 V8.2, the message class "Status message AS" must be set for all operating messages; the message class "general control message" must be set for all on-site operator actions. These message classes only support the signal change 0->1 (incoming). Signal change 1-> 0 (outgoing) is not recognized or supported. To ensure that the messages "motor off" or "slide stop" are archived correctly, these signals must also be interconnected at EventTS. With these message variants, all system states can be swiftly and unambiguously filtered and visualized from the archive (if long-term archiving is activated).

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1.5 Complete overview

The following example describes the structural design and the standardized content of the PCS 7 Water Templates.

In order to work with the Water Templates, the user should have previous practical experience in the PCS 7 engineering environment and possess process technology-related knowledge of the water industry.

All PCS 7 Water templates are limited to the essential functional content and the water-specific applications.

Additional information can be found in the following README files:

Table 1-8

No.	Link
/1/	SIMATIC PCS 7 V9.0 SP2 https://support.industry.siemens.com/cs/ww/en/view/109760505
/2/	PCS 7 Advanced Process Library (APL) V9.0 SP3 Update 1 https://support.industry.siemens.com/cs/ww/en/view/109773079
/3/	PCS 7 Industry Library (IL) V9.0 Update 1 https://support.industry.siemens.com/cs/ww/en/view/109772277
/4/	SITRANS Library (SL) V9.2 https://support.industry.siemens.com/cs/ww/en/view/109769432
/5/	SITOP Library V3.3 for PCS 7 https://support.industry.siemens.com/cs/ww/en/view/109476154

The separate engineering tool TIA Portal V14 SP1 Upd6 incl. SIMOCODE ES and/or StartDrive is used for the integration of the IPC/Comfort Panel, SIMOCODE pro V and SINAMICS G120P. It is only possible to implement engineering of SINAMICS G120X via a SMART ACCESS module interface or the associated IOP. After the IBS, the SINAMICS G120X can be worked on for maintenance and servicing purposes via PDM V9.1 with an associated FDI file from PCS 7. For further details, refer to the manual for SINAMICS G120X.

Note A complete overview of the installed software can be found in the chapter: 5.1 Installed software

Also available are S7 Water Templates for use in PCS 7 from

CPU 31x(C)-2PN/DP and/or IM151-8(F) hardware.

Note For further information about the integration of S7-300 with the Industry Library in PCS 7 (with or without telecontrol technology), refer to the following article:

https://support.industry.siemens.com/cs/ww/en/view/73133562

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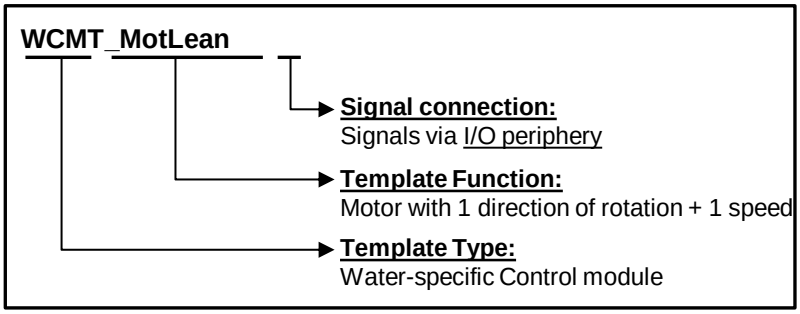
1.5.1 Definition of names and terms

The PCS 7 Water Templates for WCMTs, WEMTs and WUTs and contain uniform name and term definitions to enable quick assignment of tasks and recognition of functions.
They are composed of three criteria:

1. Template Type (WCMT, WEMT, WUT)
2. Template function (name = technology block name from APL, IL or SITRANS Library)
3. Signal connection (without text / _FbCom / _FbMMS / _FbMMS02 / _FbDrv / _FbDrv02)

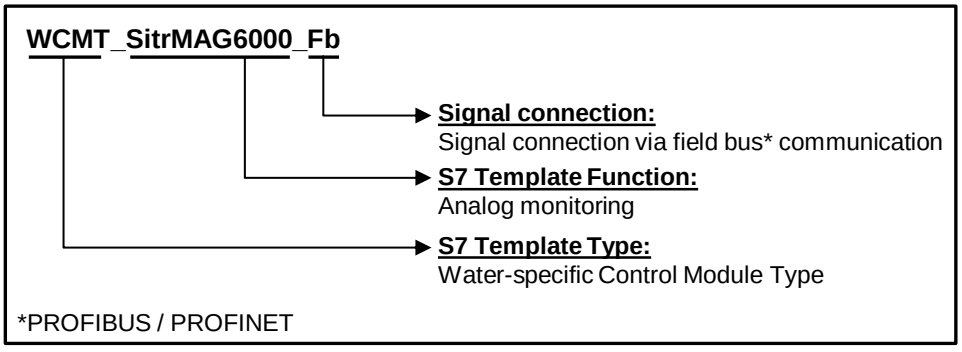
Templates that contain *no* text for the signal connection represent all CFCs with analog/digital input/output drivers.

Figure 1-5: WCMT drive with 1 direction of rotation and 1 speed



Templates whose signal connections contain "**Fb"** mark CFC plans with fieldbus drivers for PROFIBUS DP / PA or PROFINET.

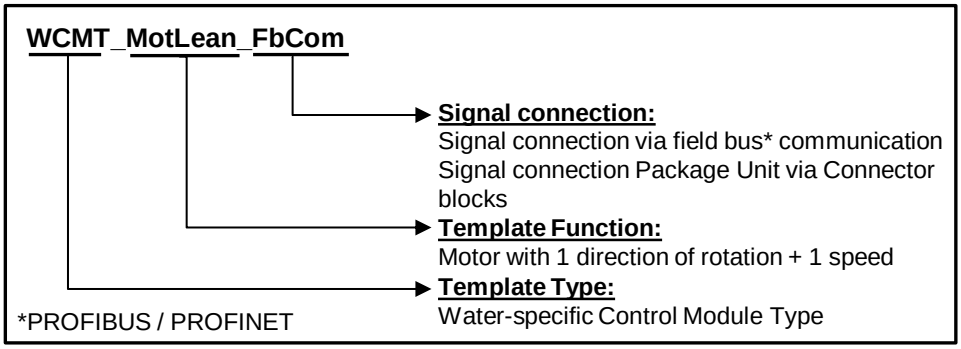
Figure 1-6: WCMT SitrMAG600_Fb with field bus coupling



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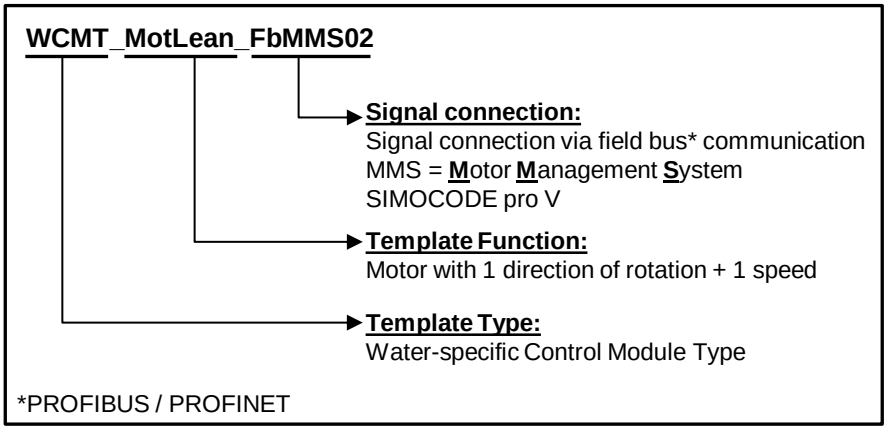
Templates whose signal connections contain "FbCom" mark CFC plans with fieldbus drivers for PROFIBUS DP / PA or PROFINET. Moreover, these Water Templates contain a simple and newly organized on-site control station, which is a functional equivalent of the first generation (<=PCS 7 V9.0 SP1). This WCMT type also contains an integrated and standardized Package Unit connection with Connector blocks.

Figure 1-7


WCMT_MotLean_FbCom
Signal connection:
Signal connection via field bus* communication
Signal connection Package Unit via Connector blocks
Template Function:
Motor with 1 direction of rotation + 1 speed
Template Type:
Water-specific Control Module Type
*PROFIBUS / PROFINET

Templates that contain the signal connection "**FbMMS**"** mark CFC plans for SIMOCODE pro V with fieldbus drivers for PROFIBUS DP.
** WCMTs with the identifier "_FbMMS" are typicals of the first generation for SIMOCODE pro V with PB and PN.
Typicals from the second generation of SIMOCODE pro V are designated with the identifier "_FbMMS02" in cases where changes have been made to them at the on-site control stations that are functional equivalents of the first generation (<= PCS 7 V9.0 SP1).
A combination of both SIMOCODE generations in one CPU is thus ensured.

Figure 1-8: WCMT SIMOCODE 1 direction of rotation-1 speed and field bus connection



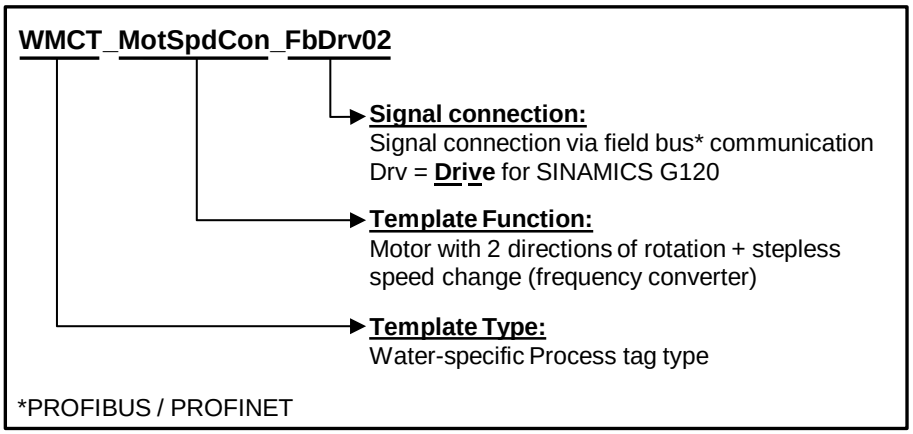
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Templates that contain the signal connection "**FbDrv****" mark CFC plans for SINAMICS G120 with fieldbus drivers for PROFIBUS DP.

** WCMTs with the identifier _FbDrv are typicals of the first generation for SINAMICS G120 P/X connections with PB and PN.
The typicals from the second generation for the new SINAMICS G120 P/X are designated with the identifier "_FbDrv02" if changes have been made to them at the on-site control stations.

A combination of both SINAMICS generations in one CPU is thus ensured.

Figure 1-9: WCMT SINAMICS frequency converter with 2 directions of rotation and field bus connection


WMCT_MotSpdCon_FbDrv02
Signal connection:
Signal connection via field bus* communication
Drv = Drive for SINAMICS G120
Template Function:
Motor with 2 directions of rotation + stepless speed change (frequency converter)
Template Type:
Water-specific Process tag type
*PROFIBUS / PROFINET

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1.5.2 Overview of PCS 7 WCMT

A total of 54 PCS 7 Water Templates of "control module type" are available to you. The following table shows all templates in alphabetical order:

Table 1-9

Name	Function
WCMT_AccuS	Derivation of a weighted accumulated value, which can consist either of a count value or a constant measured value
WCMT_Aggr08	Unit switchover for up to 8 drives
WCMT_Aggr16	Unit switchover for up to 16 drives
WCMT_AUMAVx_FbCom	Control of AUMA actuators
WCMT_CommRedSingle	The block coordinates telegrams (SEND/REV) between a redundant and non-redundant AS via S7 communication
WCMT_Communication	Connection of Package Units via PUT and GET communication blocks
WCMT_HachLange [NEW]	Monitoring of Hach-Lange sensors
WCMT_MODBUS_TCP_CP_RED [NEW]	Communication via Modbus
WCMT_MonAnalog	Analog monitoring for flow rate, level, temperature, pressure
WCMT_MonAnalog_FbCFU	Analog monitoring with field bus connection

Name	Function
	for flow, level, temperature, pressure, etc.
WCMT_MonAnalog08	Analog monitoring with 8 limits for flow, level, temperature, pressure, etc.
WCMT_MonDigital	Digital monitoring
WCMT_MonDigital08	Digital monitoring with 8 binary inputs
WCMT_Mot2Spd_FbCom	Motor with two speeds and one direction of rotation
WCMT_Mot2Spd_FbMMS02	Motor with two speeds and one direction of rotation with field bus connection to SIMOCODE pro V
WCMT_MotLean_FbCom	Motor with one speed and one direction of rotation
WCMT_MotLean_FbMMS02	SIMOCODE pro V motor with one speed and one direction of rotation with field bus connection
WCMT_MotRev_FbCom	Motor with one speed and two directions of rotation
WCMT_MotRev_FbMMS02	Motor with one speed and two directions of rotation with field bus connection to SIMOCODE pro V
WCMT_MotSpdCon_FbCom	Motor via frequency converter with infinitely adjustable speed and two directions of rotation
WCMT_MotSpdCon_FbDrv02	Motor via frequency converter with infinitely adjustable speed and two directions of rotation with field bus connection to SINAMICS G120
WCMT_OpAn	Operation of an analog value via interconnection or faceplate operation (setpoint)
WCMT_OpD	Operation of a digital value via interconnection or faceplate operation (command)
WCMT_OpTrig	Operation of a digital value via interconnection or faceplate operation as a pulse signal (ON button)
WCMT_PAC	Monitoring and acquisition of data from SENTRON PAC devices
WCMT_PC_BusBar	PCS 7 Power Control BusBar
WCMT_PC_Feeder	PCS 7 Power Control Feeder
WCMT_PC_Feeder_2CB	PCS 7 Power Control Feeder 2CB
WCMT_PC_Line	PCS 7 Power Control Line
WCMT_PC_MEAS	PCS 7 Power Control Measuring Point
WCMT_PC_Sync	PCS 7 Power Control Device Synchronization
WCMT_PC_Trafo	PCS 7 Power Control Transformer
WCMT_PIDConL	Continuous PID controller
WCMT_PIDStepConL	PID step controller

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Name	Function
WCMT_Polygon	Operable polygon with 8 turning points
WCMT_SITOP_PSU8600_1x0	Monitoring of the PSU 8600 power supply system with one output
WCMT_SITOP_PSU8600_4x0	Monitoring of the PSU 8600 power supply system with four outputs
WCMT_SITOP24V_Modular	Monitoring of SITOP 24 V power supplies. Redundancy, selectivity, buffering
WCMT_SitrHR200_Fb	SITRANS HR200 Level measurement (ultrasonic)
WCMT_SitrLR2xx_Fb	SITRANS LR2xx Level measurement (pulse radar)
WCMT_SitrMAG6000_Fb	SITRANS MAG6000 flow measurement
WCMT_SitrP_Fb	SITRANS P Pressure Transmitter
WCMT_SitrTH_Fb	SITRANS TH Measuring transducer
WCMT_SPCurve	Setpoint curve block, programmable up to 96 turning points
WCMT_SplitrangeControl	Controls up to four drives or motorized sluices via a PID controller
WCMT_TimeScheduling	Weekly switch timer with 8 switching points
WCMT_UsrM	Multi-user block across 8 control levels with a control command "1 of n"
WCMT_VlvAnalog_FbCom	Valve with analog actuating signal
WCMT_VlvLean_FbCom	Valve with two end positions and no intermediate position
WCMT_VlvLean_FbMMS02	Valve with two end positions and no intermediate position, with field bus connection to SIMOCODE pro V
WCMT_VlvMotor_FbCom	Motorized sluice
WCMT_VlvMotor_FbMMS02	Motorized sluice with field bus connection to SIMOCODE pro V
WCMT_VlvPos_FbCom	Motorized sluice with analog position monitoring
WCMT_VoteAnL	Mean value calculation from up to 8 measured values with plausibility check and determination of the minimum and maximum valid values

1.5.3 Overview of PCS 7 WEMT

Water-specific Water Equipment Modules are in early stages.

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1.5.4 Engineering with Control Module (CM) Technology

With the use of water-specific control module types, in this example WCMT, different types of instances can be created in the project. An instance is a copy of the type and is adjusted to the specific requirements through the activation of optional blocks. Necessary changes, such as the extension by additional message or channel modules, are not carried out at every instance, but centrally at the type (template) in the master data library.

Note The application example "Control Module (CM) Technology - Efficient Engineering in PCS 7" gives you a general overview of how a CMT is created, extended and instantiated. The application example is available under the following link: https://support.industry.siemens.com/cs/ww/en/view/109475748

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Selecting a variant

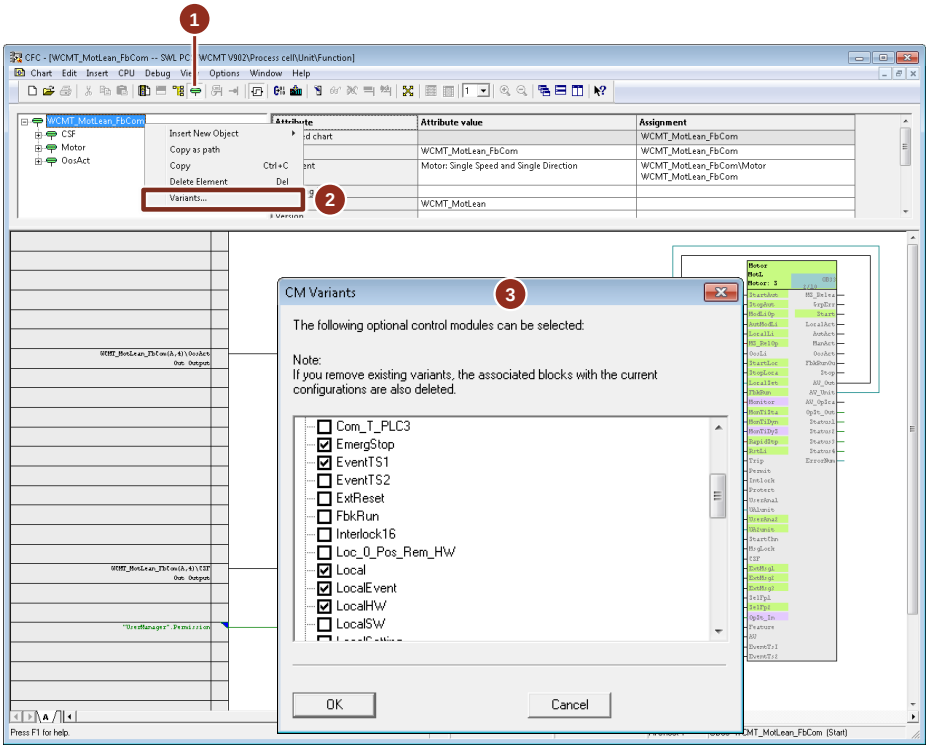
By default, the "Optional" attribute of all the blocks is deactivated in a variant, that is, the required blocks must be connected in a project- and task-specific way. This reduces the memory requirements and the required CPU project objects.
A variant and the options necessary for solving the automation task are determined in the instance. For this purpose:

(1) The technological connections are displayed in the CFC.

(2) The available variants are displayed in the context menu.

(3) The functionality required for the automation task is determined by selecting the options.

Figure 1-10



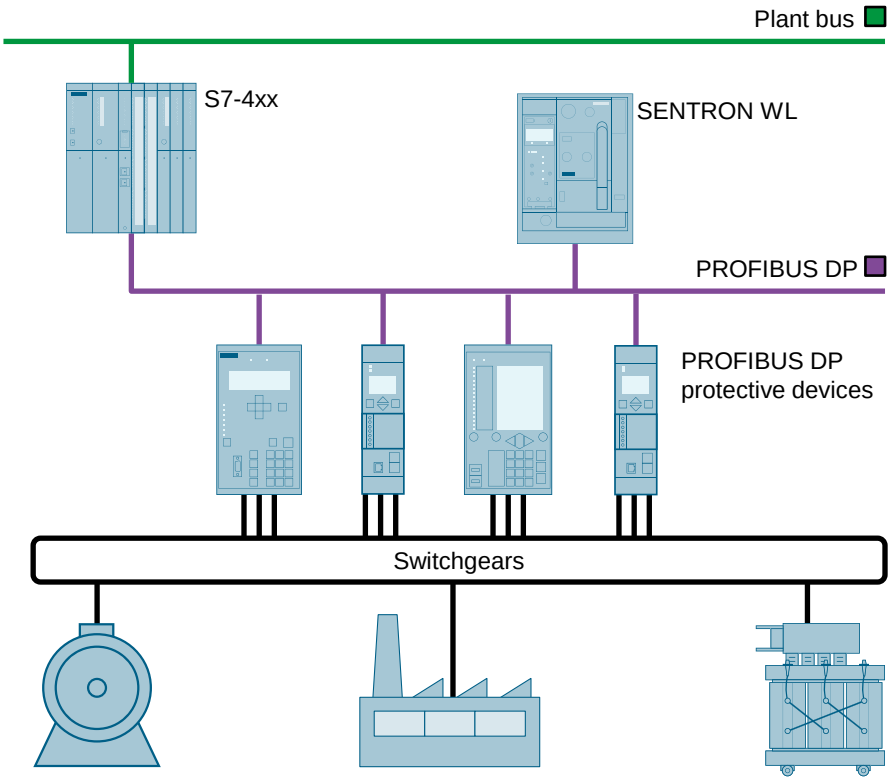
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1.6 Solution for energy management

With Totally Integrated Power, Siemens offers innovative and interface-optimized products and systems for electrical energy distribution. These are optimally matched to each other and enable easy integration into plants within the water industry. The connection to the automation system is established via communication and software modules.

The Siemens portfolio includes planning tools and matching hardware: from medium voltage switchgear and distribution systems to transformers, switching and protection devices, low voltage busbar systems as well as small distribution boards and sockets. Both maintenance-free medium voltage and low-voltage switchgear as well as their specific busbar interfaces are type-tested.

Figure 1-11



The SIVACON S8 switchboard and the 8PS busbar trunking system are used at the low voltage level. The SIVACON systems ensure safe operation with high plant and operator protection. Furthermore, the SIVACON LR busbar trunking system is proven to provide optimized and safe power conveyance in aggressive wastewater atmospheres, offering high short-circuit resistance and modular outlet boxes. Whenever economical, safe and reliable low-voltage power distribution is required, the SENTRON family offers intelligent circuit breakers, proven load breaker switches and innovative multifunction measuring devices. SENTRON products come with an extensive range of accessories and are modularly designed for high versatility and flexibility.

SIPROTEC is the standard for protection, automation and monitoring of your network at the medium-voltage level. The SIPROTEC 4 device families implement protective, control, measurement and automation functions in one integrated device. The connection can be established via PROFIBUS DP.

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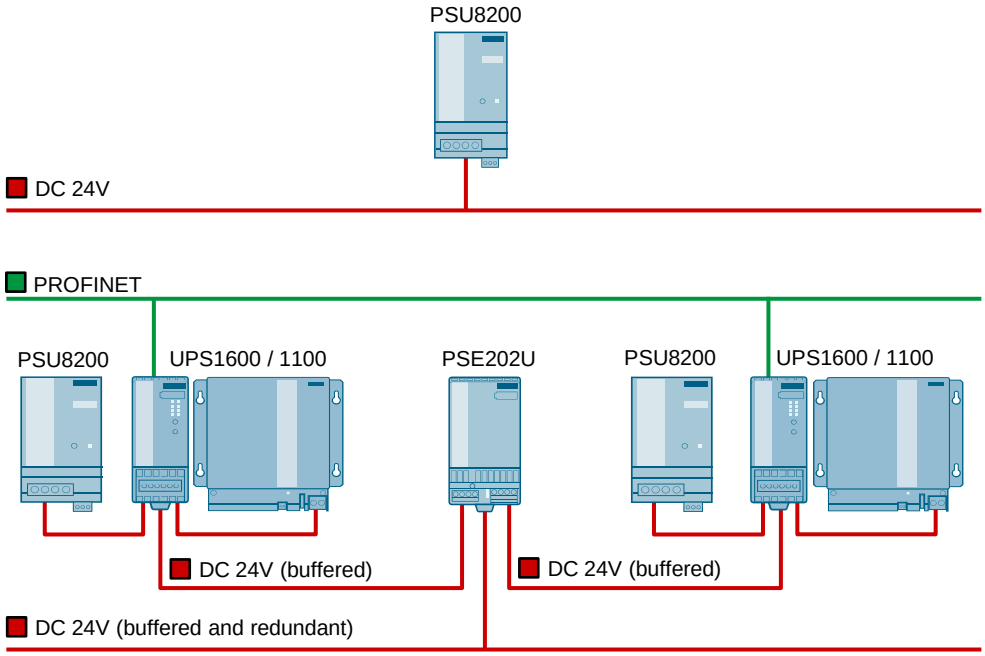
With the SIPROTEC 5 version, you get access to a new, highly modular and therefore flexible generation of intelligent, digital field devices. SIPROTEC 5 offers a comprehensive product range with modular elements for every application and requirement. The connection can be established via PROFINET.

1.7 Solutions for 24V power supply

SITOP modular

The following schematic diagram shows the base 24V power supply until the uninterruptable redundant 24V power supply:

Figure 1-12



SITOP modular is the power supply series for the lower power range that has an extremely slim, space-saving design, making it particularly suitable for integration in distributed applications such as inside switch boxes or in a control cabinet. There is a suitable power supply with optional expansion modules for every application, such as:

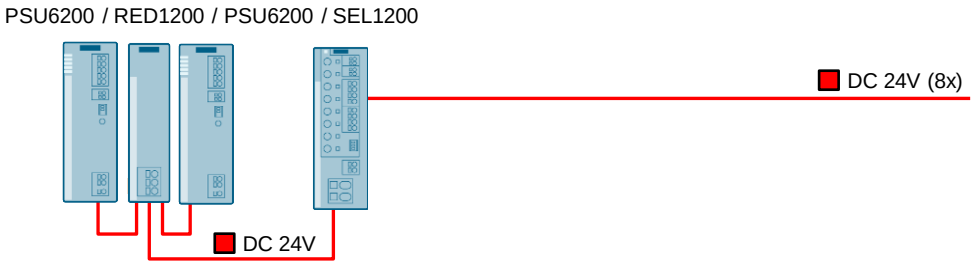
- SITOP PSU8200: 1 and 3-phase 24 V power supplies
- SITOP PSE202U: Redundancy module for decoupling SITOP PSU8200
- SITOP PSE200U: Selectivity module for monitoring 24 V feeders
- SITOP UPS1600: Uninterruptible DC power supply (DC-UPS) with signaling contact
- SITOP UPS1600: Uninterruptible DC power supply (DC-UPS) with Ethernet/PROFINET

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SITOP PSU6200

The following schematic diagram shows the 1- or 3-phase do-it-all SITOP PSU6200 power supply with redundancy and selectivity.

Figure 1-13



SITOP PSU6200 is the do-it-all power supply.

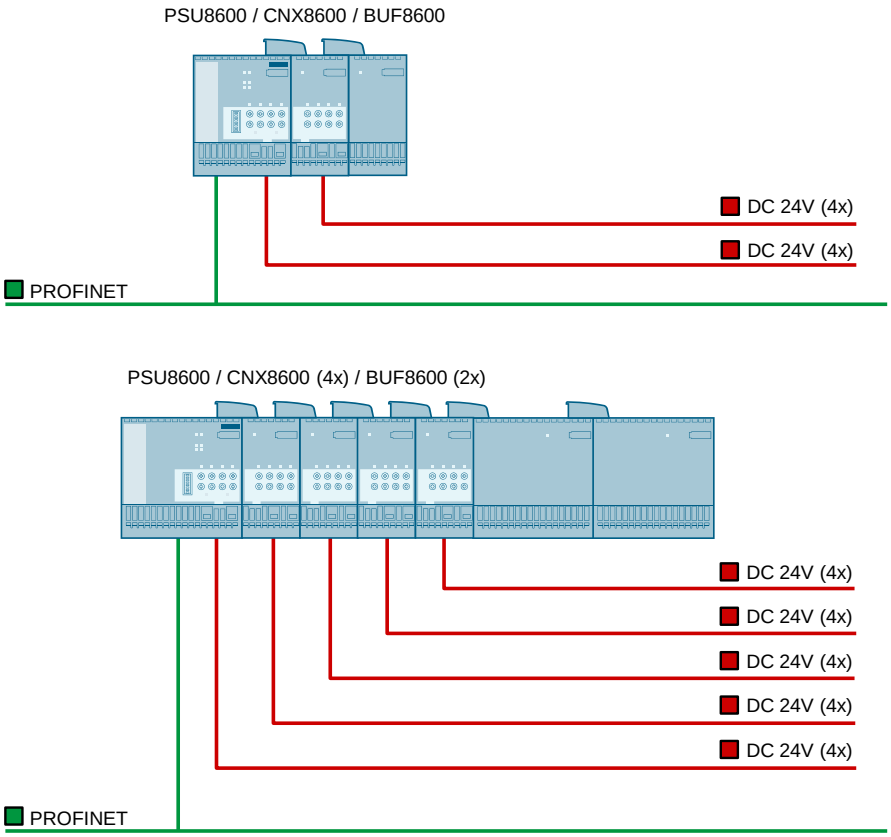
- PSU6200: the 1- or 3-phase power supply with a wide range of use cases and currents, from 12V/2A to 24V/20A
- RED1200: The redundancy module for decoupling two SITOP 6200 power supplies
- SEL1200/1400: Selectivity module with 8 feeders and switching or limiting characteristic

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SITOP PSU8600 power supply system

The following schematic diagram shows the 3-phase scalable 24V SITOP PSU8600 power supply system with selectivity and buffering:

Figure 1-14



SITOP PSU8600 is the power supply system with PROFINET.

- PSU8600: the 3-phase power supply with 20A or 40A and 1 or 4 selective feeders
- CNX8600: the expansion module with 4 selective feeders each
- BUF8600: the buffer module for bridging short to moderate power outages
- UPS8600: the UPS module for bridging moderate grid outages on the order of minutes to hours at full system power
- BAT8600: the battery buffer module in the event of grid outage

Note

The used faceplates and icons of the WCMT_SITOP templates are described in the profile. The profiles are part of this application example and you can obtain them from your regional sales partner.

In the chapter entitled 3 WCMT / (WEMT) profiles you will find the description of a profile using an example.

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Further information, application examples and libraries can be found at the links in the following table:

Table 1-10

No.	Article
/1/	Integration and Simulation of a SITOP 24 V Power Supply in SIMATIC PCS 7 https://support.industry.siemens.com/cs/ww/en/view/109481908
/2/	SITOP UPS1600: Faceplates and communication blocks (TIA Portal, STEP 7 and WinCC) https://support.industry.siemens.com/cs/ww/en/view/78817848
/3/	SITOP PSU8600: Faceplates and communication blocks (TIA Portal, STEP 7 and WinCC) https://support.industry.siemens.com/cs/ww/en/view/102379345
/4/	All Application Examples https://support.industry.siemens.com/cs/ww/en/ps/18018/ae

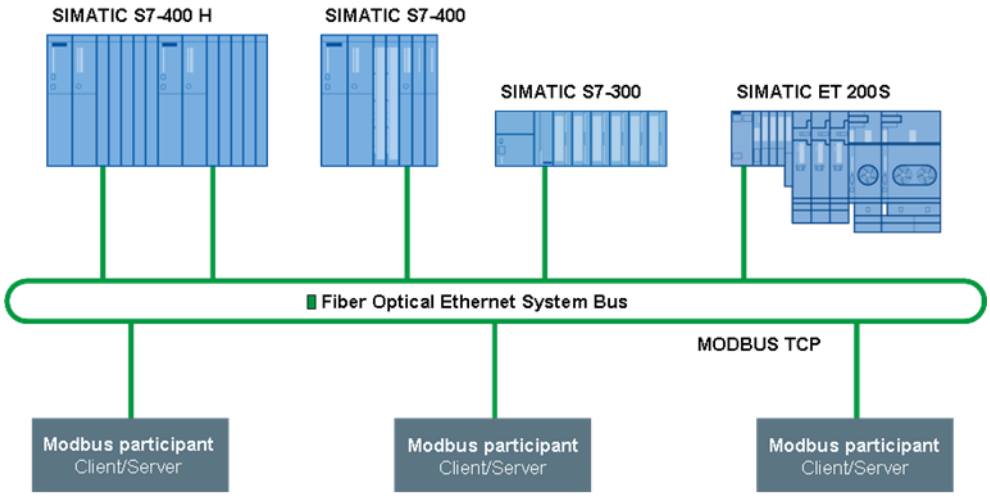
1.8 Solutions with Modbus/TCP

Modbus is a communication protocol that is used worldwide, is open to all users and supported by many manufacturers.

The requirement of connecting external systems to SIMATIC PCS 7 via Modbus comes into play particularly when:

- Expanding or upgrading existing systems
- Coupling controllers and systems of different manufacturers (also in the course of constructing new systems)

Figure 1-15



Modbus is based on a client-/server architecture (also known as master/slave architecture) that can be realized within PCS 7 in multiple different ways.

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The implementation is done with a Modbus/TCP library, available in different variants, and with which you can integrate external systems via Modbus/TCP into PCS 7.

In doing so, you can significantly reduce your engineering effort as well as increase performance. You can use this solution for both new configurations as well as for integration into existing projects. The required hardware and software products are all made by Siemens and guarantee the accustomed compatibility, up-to-dateness and upgrade options. Not only the PCS 7 standard but also the Modbus standard are accounted for without exception.

When using the Modbus library you also get the following benefits:

- Easy connection of systems of different manufacturers to PCS 7 via Industrial Ethernet
- Gradual and therefore low-cost expansion or modernization of existing systems over the entire system life cycle
- Assured Siemens support
- No specific Modbus knowledge required
- Engineering in the accustomed PCS 7 environment
- Function block library with online help in German and English

Note

You can find additional information on Modbus/TCP in the following articles:
Modbus/TCP-standardized and redundant communication of SIMATIC PCS 7 with third-party systems
https://support.industry.siemens.com/cs/ww/en/view/75867147

Add-on modules for Modbus/TCP communication
https://support.industry.siemens.com/cs/ww/en/view/62830463

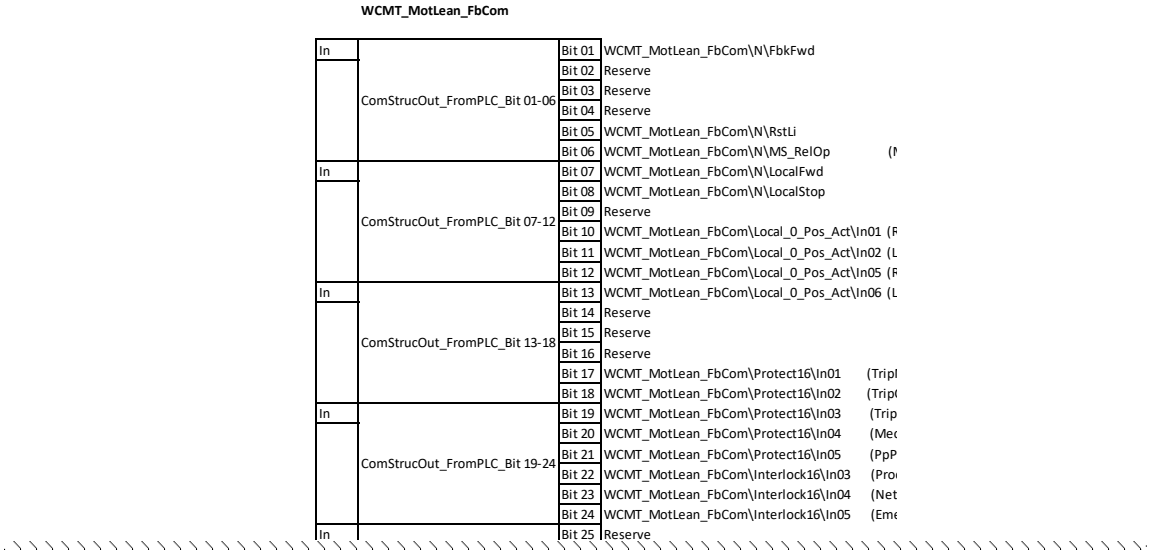
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1.9 Solutions for Package Unit connection

Corresponding interfaces are required for conventional communication with Package Units. The associated signals and parameters must be interconnected with one another laboriously and transmitted by means of a connection method (MPI, PROFIBUS, PROFINET, Industrial Ethernet, Modbus/TCP).

With the extended WCMTs, you have access to prefabricated interfaces for the first time, which you can simple modify to suit your requirements or which you can take over directly. You also minimize the engineering effort with them. Here, it does not matter which connection method the user chooses. This ensures that a continuous standardized interconnect is established from Package Unit communication, via the send/receive field of the coupling method and up until the respective PCS 7 V9.0.2 instance.

Figure 1-16 Communications interface with the Package Unit



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1.10 Solutions with Process Online Analysis

The SC controllers with sensors from the Hach product range provide you with the world's largest range of online analyzes for water and wastewater.

The following parameters are covered:

- pH, redox potential, conductivity (conductive), conductivity (inductive)
- Oxygen (LDO), oxygen (galvanic), ozone
- Chlorine (free), chlorine dioxide
- Superfine clouding, clouding, solids, sludge concentration, sludge level
- Ammonium, nitrate
- Phosphate (ortho), phosphate (total)
- SAK, TOC
- mA inputs, digital inputs

SC controllers are available with various features and can be flexibly configured according to your specifications and requirements.

The SC 1000 multichannel controller is extensible up to 8 sensors on a measuring station and can be extended in the network up to max. 32 sensors. It also allows the integration of PROFIBUS DP communication including existing 0 / 4-20mA signals via digital inputs / outputs on a SIMATIC CPU S7-1500, S7-300, S7-IM 151-8, S7-400 or PA CPU 410.

NOTE Further information of the integration of HACH SC 1000 controllers with PCS 7 can be found in the download area on the following website: https://www.hach.com/

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2 Water-specific control module types

The function blocks from the libraries: Advanced Process Library (APL), Industry Library (IL) and SITRANS Library were placed in the WCMTs in a CFC subplan A on sheet 1 to sheet 6. This structure represents a clear solution and can always be custom adjusted and changed by the user.

Figure 2-1

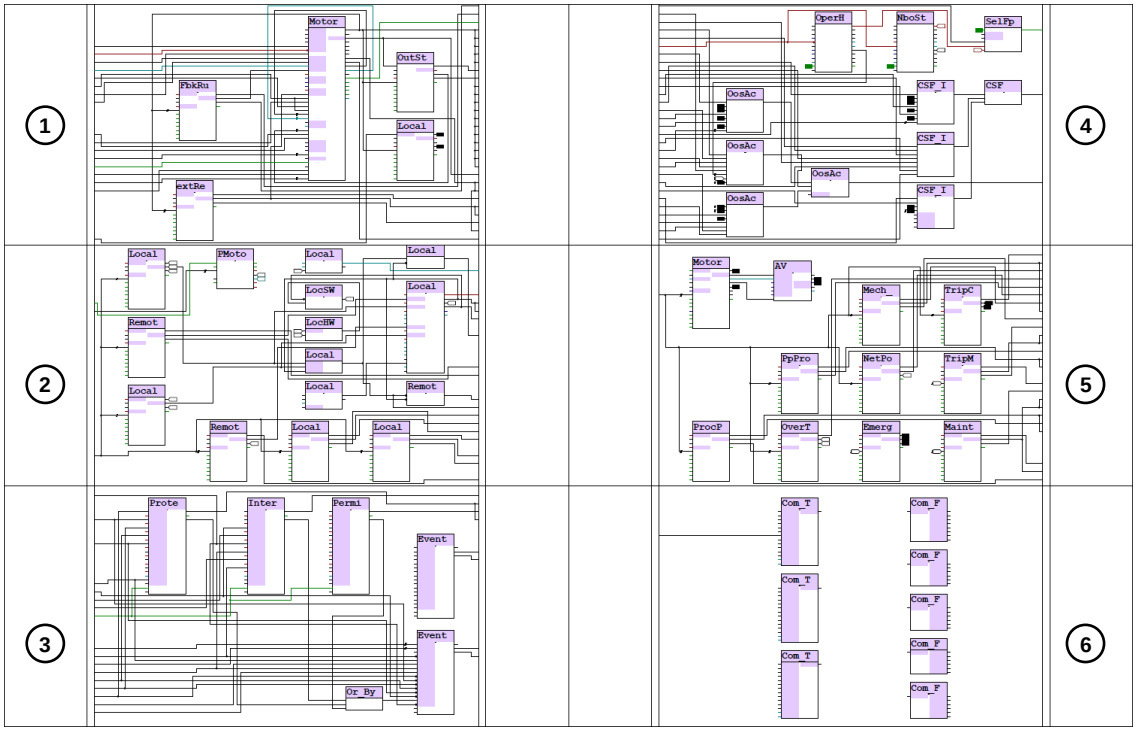


Table 2-1

Subplan A	Function blocks
Sheet 1	Technological block with input/output/field bus drivers or diagnostic monitoring
Sheet 2	Panel operation with prepared shortcut to the UsrM block (WCMT) and local control selection with/without PLC
Sheet 3	Locking and protection monitoring for Permit, Protect and Interlock as well as EventTS blocks for operation and alarm messages
Sheet 4	Faceplate for jump distributor, recording of operating cycles/hours and maintenance/diagnostics monitoring
Sheet 5	Drive monitoring (engine protection, control fuse, torque monitoring, chain monitoring, belt monitoring, filter monitoring and/or other special functions) and engine current recording with zero point suppression
Sheet 6	Communication (cross data traffic, serial couplings, I slave, Package Units, etc.)

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As an example, the following chapters describe four variants of the type WCMT of the PCS 7 Water Templates.

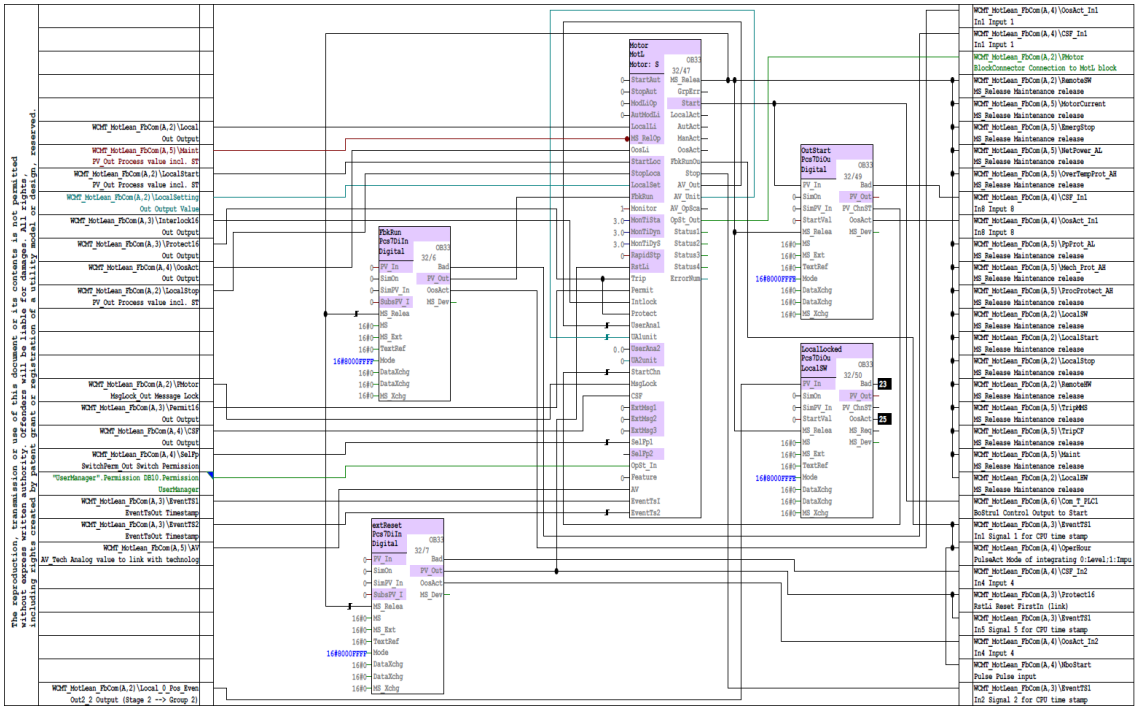
- *WCMT_MotLean_FbCom*
  - describes the content and functions with analog/digital input/output drivers
- *WCMT_MotLean_FbMMS02*
  - describes the contents and functions of SIMOCODE pro V via field bus driver connection to PROFIBUS DP
- *WCMT_MotSpdC_FbDrv02*
  - describes contents and functions of SINAMICS G120 via field bus driver connection to PROFIBUS DP
- *WCMT_SitrMAG6000_Fb*
  - describes contents and functions of the MA6000 flowmeter via field bus drive connection to PROFIBUS DP
- *WCMT_SITOP24V_Modular / WCMT_SITOP_PSU8600_1x0/4x0*
  - describes contents and functions of 1-/3-phase DC24V power supplies, power supply redundancy, uninterruptible power supply and selectivity with and without fieldbus connection (PROFINET).
- *WCMT_PC_...*
  - describes contents and functions of low- and medium-voltage distribution systems for trunk lines, circuit breakers, disconnect switches, transformers, mains synchronization and measured value monitoring with and without fieldbus connection (PROFIBUS/PROFINET).

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2.1 WCMT_MotLean_FbCom Template

2.1.1 CFC subplan A/sheet 1

Figure 2-2



In subplan A sheet 1, *WCMT_MotLean_FbCom* provides a drive function with one direction of rotation and one speed. The core technological functions are implemented by the APL block *MotL*. In subplan A sheet 1, the following signal is connected to *MotL* via the input driver *PCS7DiIn* by default:

- HW: Contact (sheet 1) -> "FbkRun" **1/0 = Feedback actuator on/off**

The ON/OFF control commands from *MotL* are passed on to the output module via the output driver PCS7DiOu *OutStart*.

Drive operation is prepared for integration with the multi-user concept (MUC, German: *MWK*) via the *WCMT_UsrM* solution. The implementation takes place on subplan A/sheet 2 of the CFC.

By default, the *WCMT_MotLean_FbCom* sample chart accounts for the following controls of various control locations typically used in the water industry:

- PCS 7 operation via the faceplate (Automatic, Manual, Out of service)
- Button operation via input module with PLC (local software)
- Keyboard operation without PLC incl. follow-up mode on PCS 7 OS (local hardware)
- Panel operation via the faceplate (Automatic, Manual)
- Seamless switchover during change of operating mode from "Local" or "Manual" to "Auto"
- Seamless switchover during change of operating mode from "Auto" to "Local" or "Manual"

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In the PCS 7 OS, the "Out of service" mode can be activated from the *MotL* faceplate. The activation is output via the interconnectable output parameters "*OosAct_Out =1*" of *MotL*. The status display in the faceplate gives feedback via the retrospective linking of all associated channel blocks (feedback signals, engine protection, etc.) to the input tag "*OosActLi*" of *MotL*.

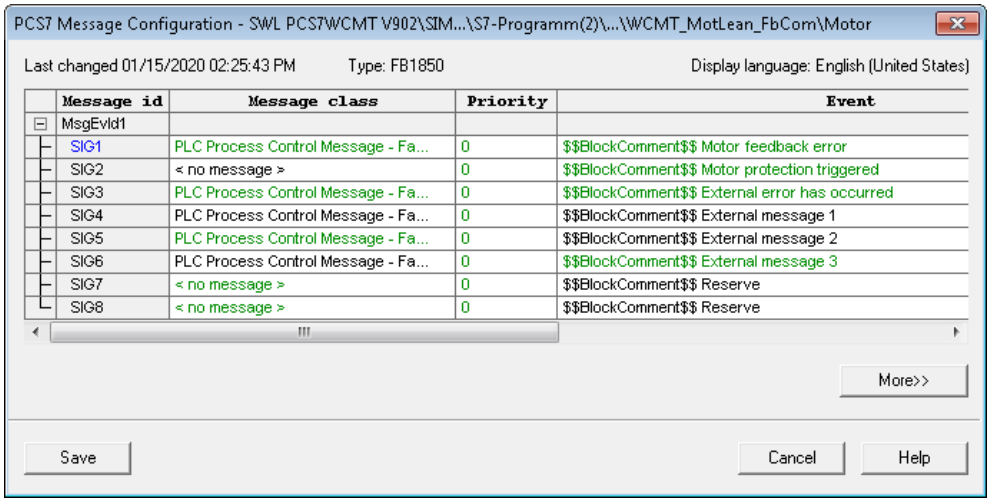
All the blocks with the fault message "Bad" are also grouped and connected to the terminal "*CSF*" of the *MotL* engine block.

The connections "*UserAna1*" and "*UserAna2*" are available in the standard view of *MotL* for the connection of two analog values, with display as auxiliary value 1 and 2. The *"UserAna1"* connection is connected to the engine current by default, while the *"UserAna2"* connection serves as a reserve for further project- and task-specific extensions.

Additional information for operating hours and operating cycles is available via the *"SelFp1"* port. The *"SelFp2"* port serves as a reserve for project-specific extensions.

In addition to this, *MotL* also gives three external messages in *WCMT_MotLean_FbCom.* This is the activation of the PCS7 OS operation "Bypass active" of the Interlock, Permission and/or Protect block.
The messages "external message 1" and "external message 3" are available to the user as a reserve for project-specific extensions.

Figure 2-3


PCS7 Message Configuration - SWL PCS7WCMT V902\SIM...\S7-Programm(2)\...\WCMT_MotLean_FbCom\Motor
Last changed 01/15/2020 02:25:43 PM
Type: FB1850
Display language: English (United States)
Message id
Message class
Priority
Event
MsgEvId1
SIG1 PLC Process Control Message - Fa... 0 $$BlockComment$$ Motor feedback error
SIG2 < no message > 0 $$BlockComment$$ Motor protection triggered
SIG3 PLC Process Control Message - Fa... 0 $$BlockComment$$ External error has occurred
SIG4 PLC Process Control Message - Fa... 0 $$BlockComment$$ External message 1
SIG5 PLC Process Control Message - Fa... 0 $$BlockComment$$ External message 2
SIG6 PLC Process Control Message - Fa... 0 $$BlockComment$$ External message 3
SIG7 < no message > 0 $$BlockComment$$ Reserve
SIG8 < no message > 0 $$BlockComment$$ Reserve
More>>
Save
Cancel
Help

For data archiving, the technology block *MotL* does not have any tags activated for the short- or long-term archive; where applicable, you can make project-specific modifications here.

2.1.2 CFC subplan A/sheet 2

WCMT_MotLean_FbCom provides various local controls in subplan A sheet 2. These include the PMotL panel module from the Industry Library with data interface to the IPC/Comfort Panel via PROFIBUS DP/PROFINET as well as the switchable local on-site controls, with and without automation connection for drive control.

Local operation of control stations

The user can choose all three local controls, or more variants, e.g. panel control + local control (hardware) without automation. Moreover, there are two options for on-site or remote switchover:

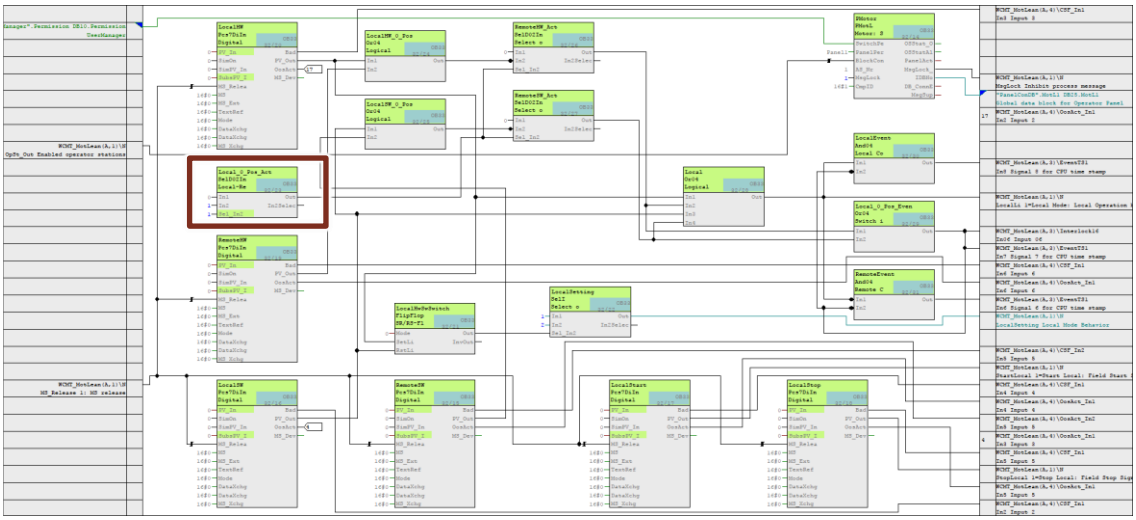
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1. **Two-point operation**
   Direct switchover between local and remote (after activation via a key-operated switch), **without** neutral intermediate position (local - remote). This is the case if the signal "0" is present at the *"Sel_In2"* input of the *Local_0_Pos_Act* block. This variant is preferably used for bumpless drive switching between local and remote locations.
2. **Three-point operation**
   Direct switchover between local and remote **with** neutral intermediate position (Local – 0 – Remote). This is the case if the signal "1" is present at the *"Sel_In2"* input of the *Local_0_Pos_Act* block. This variant is preferably used in combination with a repair switch as an additional drive switch-off (emergency stop).

Data exchange

In the AS, the tag "*BlockConnector*" (Panel) is connected to the *MotL* output "*OpSt_Out*" to enable data exchange between *MotL* and *PMotL.* All values (parameters, messages, commands) are read and written via this connection. An output tag *IDBNR* on *PMotL* links the AS with the icons and the corresponding faceplates on the IPC/Comfort Panel via not less than one instance DB with resource-dependent "structure". The *IDBNR* is the communications interface between devices. The data exchange on the IPC/Comfort Panel in the TIA Portal is done with symbolic addressing.

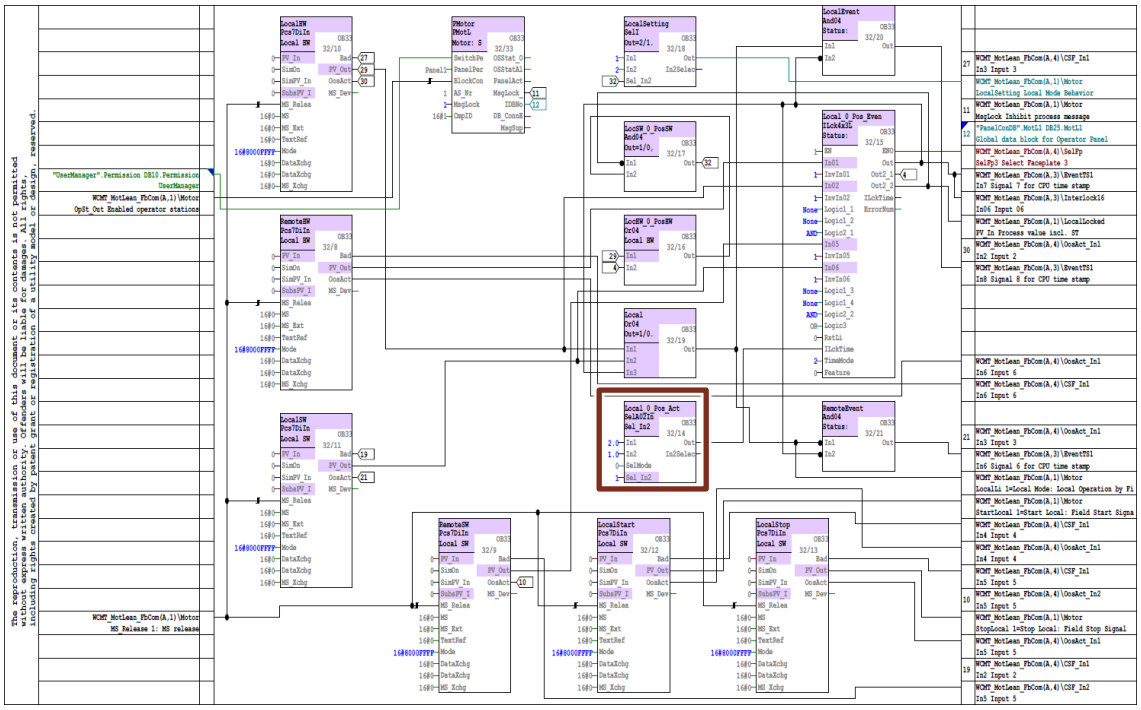
Figure 2-4 First-generation local control stations



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With the PCS 7 Water Template Library V9.0.2, the second generation replaces the first generation of local control station with LocalHW and LocalSW, including 2- and 3-position switches for local/remote switchover. This new second generation contains all functions of the first generation.

Figure 2-5 Second-generation local control stations



In addition, the laborious Boolean logic of the first generation has been manageably streamlined with the new Industry Library block "Ick 4x3". At the same time, the new local control station solution has been extended with the optional possibility of an additional standardized local control station via a Package Unit communication.

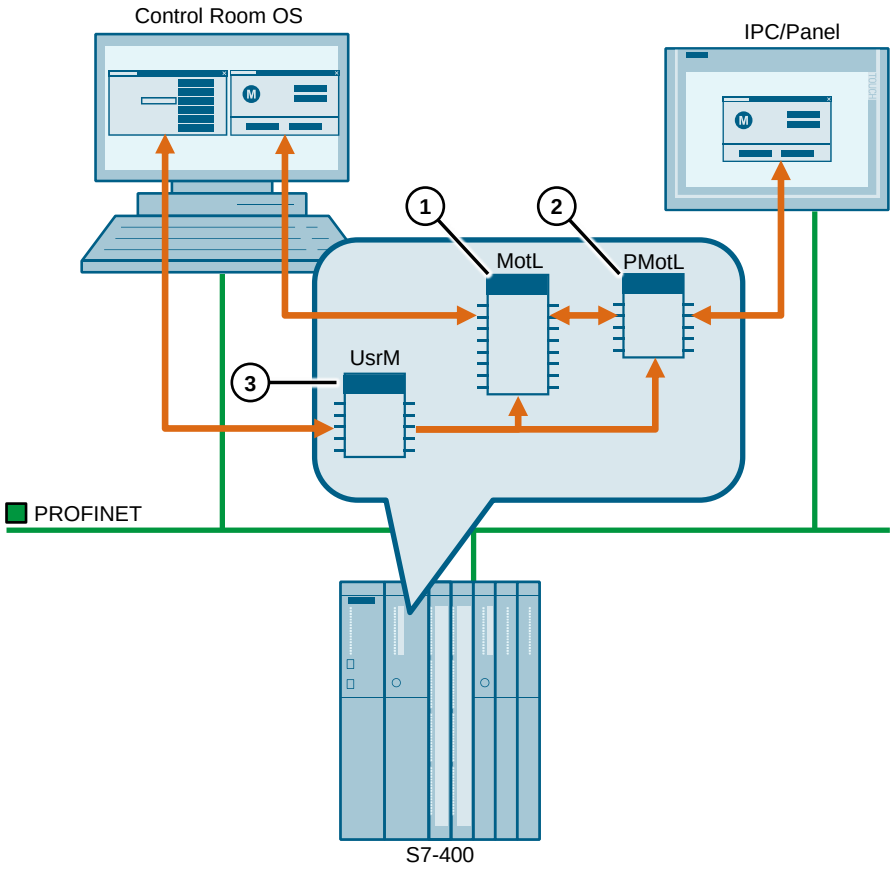
Here, it does not matter which connection method the user chooses (MPI, PROFIBUS, PROFINET, Industrial Ethernet, Modbus). This ensures that a continuous standardized interconnect is established from the Package Unit communication send/receive field up until the respective PCS 7 V9.0.2 instance. The Package Unit data are connected with 2 to 3 connections per instance via Connector blocks with the send/receive data area of the respective coupling method. For further details, please refer to chapter 2.1.6 **CFC subplan A/sheet 6**

Panel operation

The following schematic picture shows the communication between automation, Comfort Panel and PCS 7 OS.

The panel block always has a direct link to the PCS 7 technology block. If the panel block *PMotL* and the technology block *MotL* are connected to *WCMT_UsrM,* the result is the integration of a multi-user concept (MUC) with the PCS 7 OS servers. Figure 2-6

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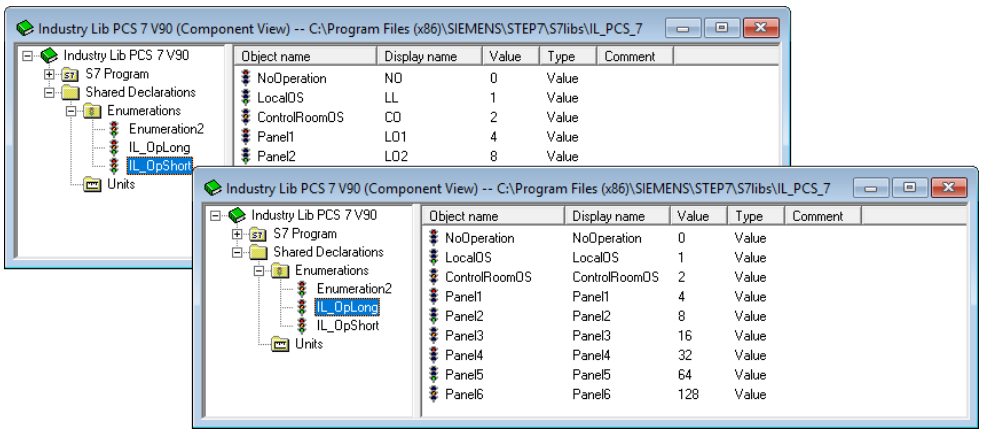
(1) Technology block

(2) Panel interface module

(3) Block for selecting the control room

The multi-user concept can manage up to 8 different control locations (OS server and/or Panel). The term "operator location" is to be classified locally, e.g. local control room or panel. Each control location receives a switching permission number (PERM = permission), which is created in the PCS 7 project under "Global declarations/enumerations" and connected to *WCMT_UsrM*. The prepared enumerations can be copied from the IL into the project.

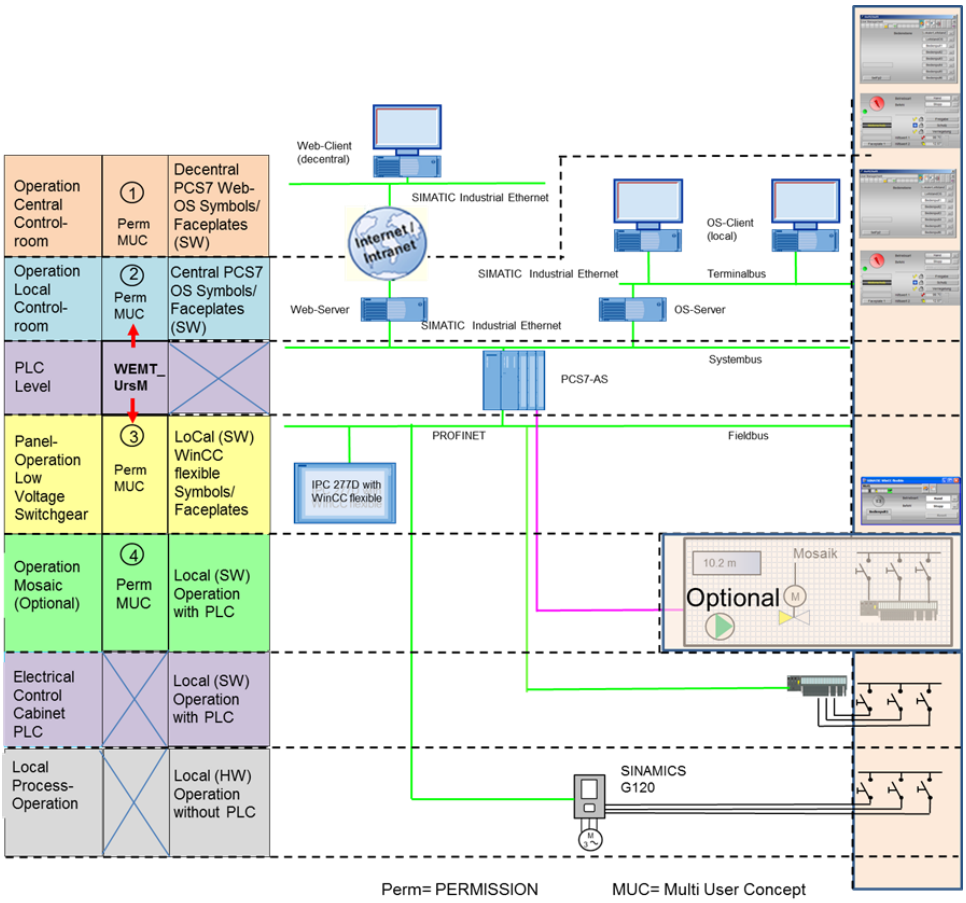
Figure 2-7



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Each control location receives an additional switching permission number (PERM) on the OS Server page, which is stored in the internal tag management of WinCC Explorer. The local operating release is performed by comparing the value of these internal tags "@APLOpStation" with the value at the connection "OpSt_In" in the block instance of the panel block.
If they are identical, the operator receives access rights to the related process objects on the respective operator station. If they are not identical, it will only be possible to monitor the process. The parameters for the communication links needed between AS and Comfort Panel/IPC must be assigned in the HW Config and NetPro. In addition, the configuration must likewise be entered depending on the panel type (IPC/Comfort Panel) from SIMOCODE ES V14 SP1 Upd6 onward (TIA Portal).

Fig. 2-8



Note

For further information and configuring aids regarding the multi-user concept and the Panel integration, please refer to the following item

"Integration of Comfort Panels, Operator Panels and S7-300 Package Units in SIMATIC PCS 7 with PCS 7 Industry Library"
https://support.industry.siemens.com/cs/ww/en/view/50708061

or in the manual, chapter 2.4 "Multi-station control concept" of the Industry Library for PCS 7
https://support.industry.siemens.com/cs/ww/en/view/109750809/65599501963

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In addition to the Panel controls, subplan A sheet 2 also provides local controls with hardware and software-based connectivity. Especially in the water industry, both variants may be used together or individually. A typical variant is local control from the low-voltage switchgear with software-based control via digital inputs of the automation system.

When the local software switch is set to "*LocalSW = 1*" (see key switch "-S4"), the "*LocalSW*" signal is forwarded to the "*Local_0_Pos_Event*" via the "*PCS7DiIn*" input driver.

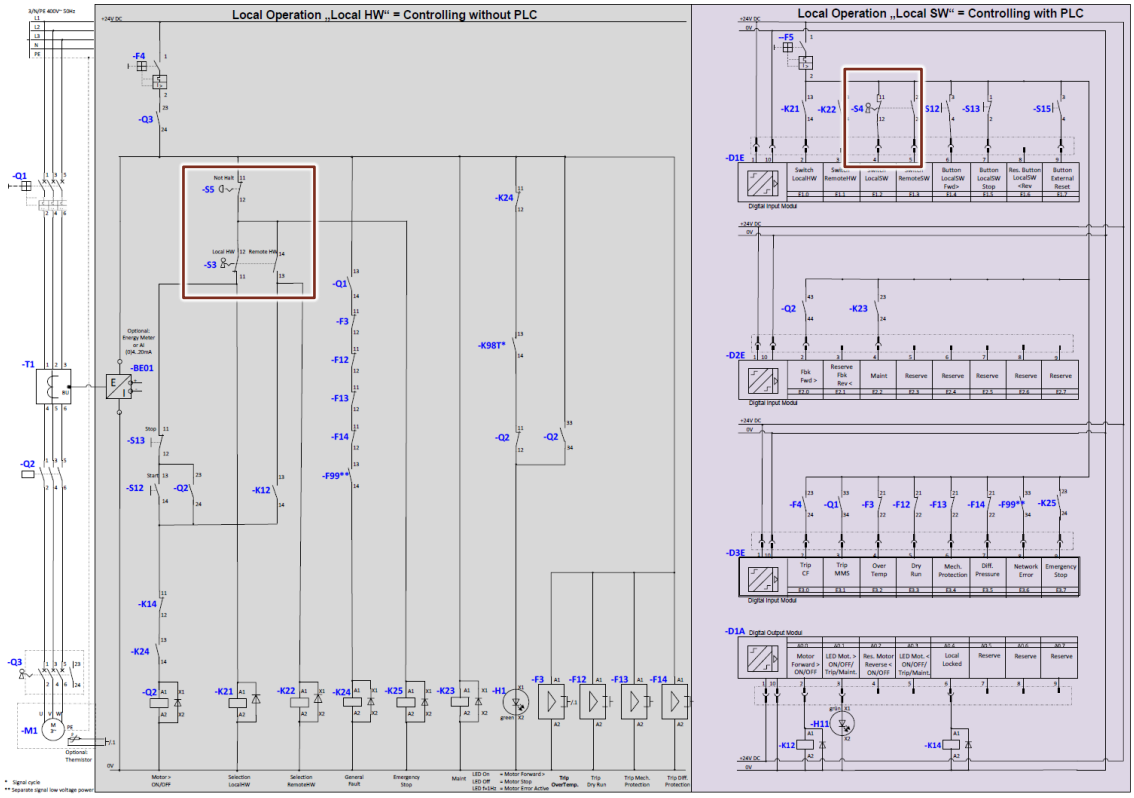
The switch to "LocalSetting = 1" is automatically preset at "LocalSW = 1".
The preselected operating mode on the LocalSetting block is transferred directly to the input "LocalSetting" of MotL.

At the same time, the Local block enables permission for the external local control at MotL.

The "Start" and "Stop" pushbuttons are connected with input drivers PCS7DiIn LocalStart and LocalStop (see pushbuttons "-S12" and "-S13"). These signals are transmitted directly to MotL.

The local on-site operation from the field (LocalHW/RemoteHW = -K21/-K22) is purely hardware-based and provides an independent emergency operating level, in the case of an automation or communication breakdowns.

Figure 2-9: Two-point operation

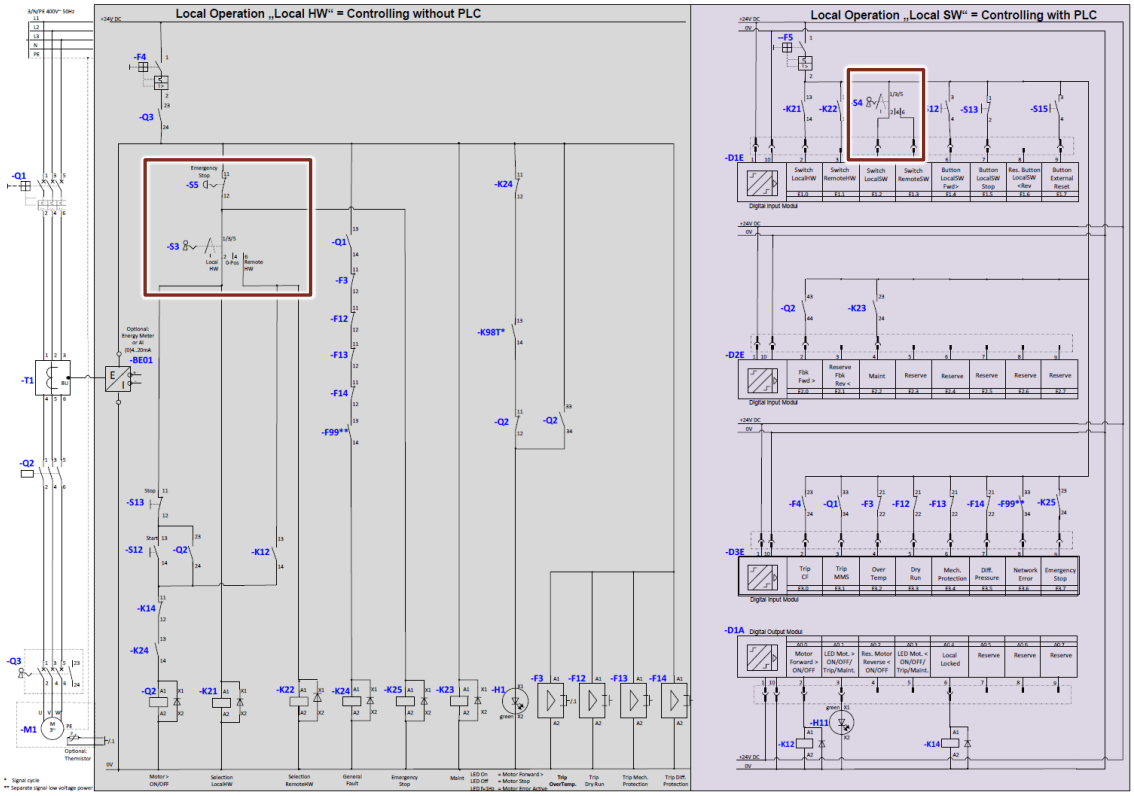


If the local switch (-K21) is set to the input (E1.0) "LocalHW=1", the signal is transmitted to the Local CFC block. At the CFC block "LocalSetting" the preselection takes place "2" = follow-up operation without any AS controlling. The preselected operating mode „2" is forwarded by the block LocalSetting via output "Out" directly to the input "LocalSetting" of MotL

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Additional the Local CFC block enables over the output "Out" the permission of the external local control via the input "LocalLi" of MotL In this operating mode, the drive feedback "FbkRun" is transmitted to MotL via the driver block PCS7DiIn in subplan A, sheet 1 and the reported faults from CFC-Plan 3 and 5 are tracked.

Figure 2-10: Three-point operation



The hardware solution shown above is activated by re-parameterization in CFC chart 2 of WCMT_MotLean_FbCom at the "Local_0_Pos_Act of parameter IN1 from 0> 1" block.

After activation by a key switch, the local on-site operation considers a switchover between on-site, remote and a neutral intermediate position (local - 0 - remote).

With the simultaneous use of both variants of local control (LocalSW + LocalHW), the hardware-based control (LocalHW) has more often priority over the software-based control (LocalSW).

Exceptional case

Independent from the local switch position "LocalHW", if you put the the local on-site operation "LocalSW" switch to the neutral intermediate position "(0-Pos) = drive lock", the drive lock get automatically the higher operator authorization.

WARNING

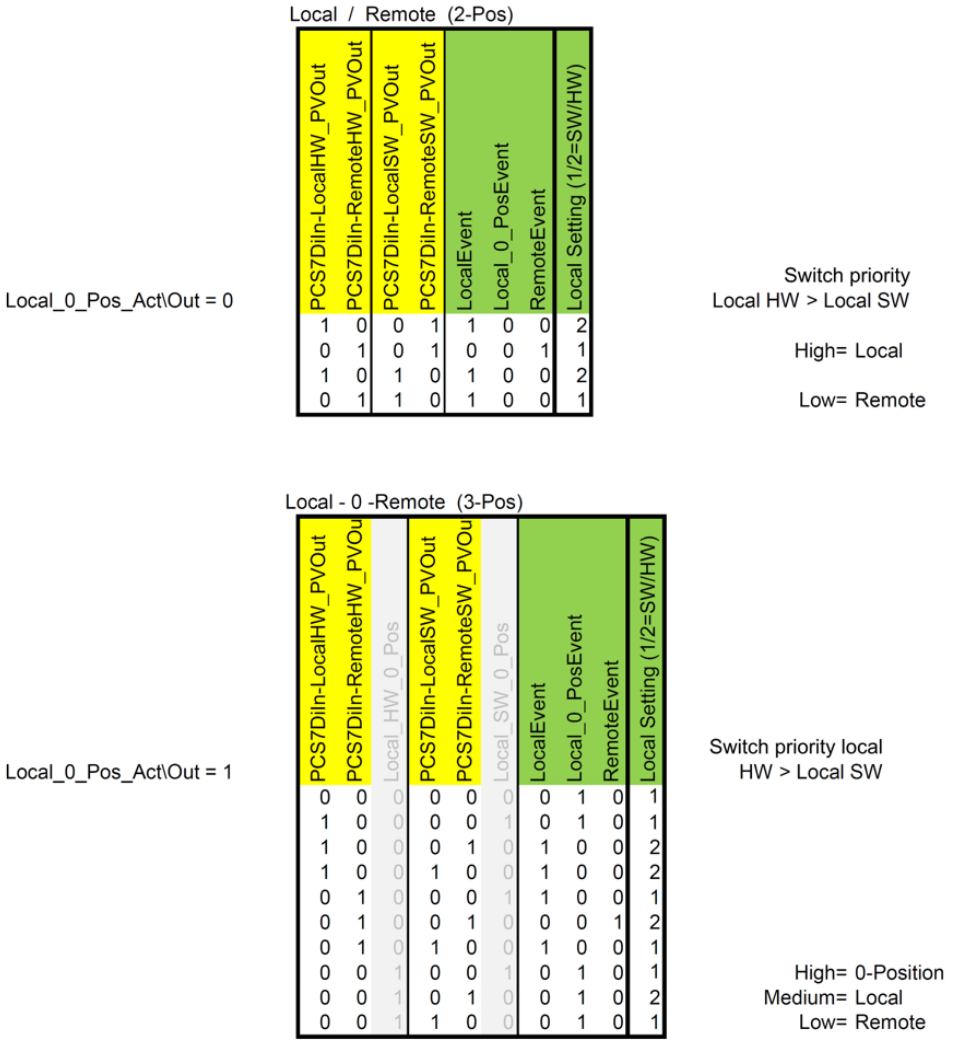
Important safety warning:

That the previously described the drive lock "LocalSW = 0" takes effect in the hardware control circuit of the drive, it must be locked via a digital output PCS7DiOut (Local Locked = partial plan 1) with the relay contact or alternatively with an additional auxiliary relay.

If this is not taken into account, it is possible to operate the drive via LocalHW using the on/off buttons in the control circuit despite the pending LocalSW drive lock.

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Figure 2-11


Local / Remote (2-Pos)
Local_0_Pos_Act\Out = 0
PCS7DiIn-LocalHW_PVOut
PCS7DiIn-RemoteHW_PVOut
PCS7DiIn-LocalSW_PVOut
PCS7DiIn-RemoteSW_PVOut
LocalEvent
Local_0_PosEvent
RemoteEvent
Local Setting (1/2=SW/HW)
1 0 0 1 1 0 0 2
0 1 0 1 0 0 1 1
1 0 1 0 1 0 0 2
0 1 1 0 1 0 0 1
Switch priority
Local HW > Local SW
High= Local
Low= Remote
Local - 0 -Remote (3-Pos)
Local_0_Pos_Act\Out = 1
PCS7DiIn-LocalHW_PVOut
PCS7DiIn-RemoteHW_PVOu
Local_HW_0_Pos
PCS7DiIn-LocalSW_PVOut
PCS7DiIn-RemoteSW_PVOu
Local_SW_0_Pos
LocalEvent
Local_0_PosEvent
RemoteEvent
Local Setting (1/2=SW/HW)
0 0 0 0 0 0 0 1 0 1
1 0 0 0 0 0 1 0 1 0 1
1 0 0 0 1 0 0 1 0 0 2
1 0 0 1 0 0 0 1 0 0 2
0 1 0 0 0 1 1 0 0 0 1
0 1 0 0 1 0 0 0 0 1 2
0 1 0 1 0 0 0 1 0 0 1
0 0 1 0 0 1 0 1 0 1 1
0 0 1 0 1 0 0 0 1 0 2
0 0 1 1 0 0 0 1 0 0 1
Switch priority local
HW > Local SW
High= 0-Position
Medium= Local
Low= Remote

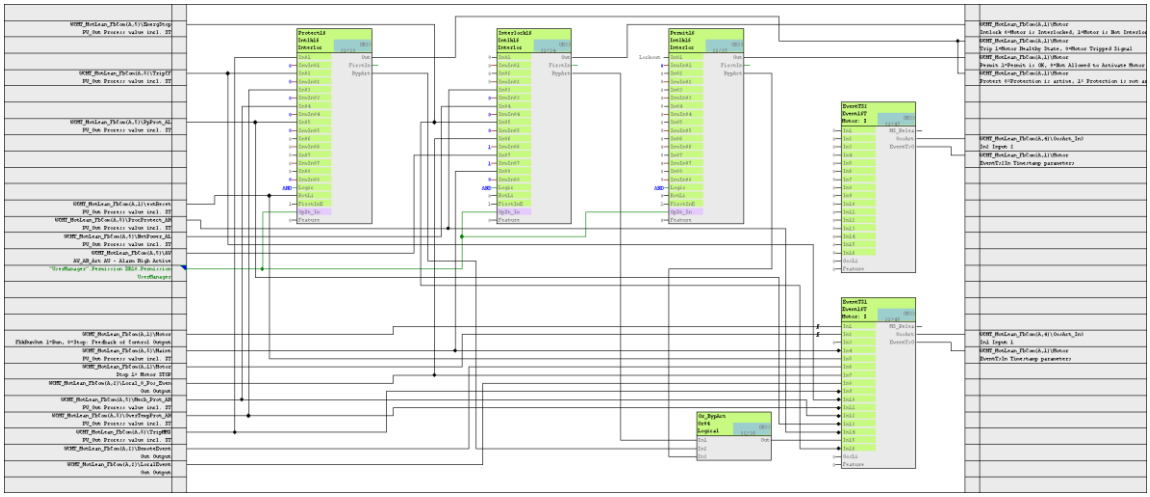
Note Thanks to the integration of different operation modes, including an emergency mode, the PCS 7 Water Templates fulfill one of the main water-specific requirements in the water industry.

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2.1.3 CFC subplan A/sheet 3

Subplan A sheet 3 takes into account the permission, protection, and locking function of *WCMT_MotLean_FbCom*. Three *Interlock16*- blocks from the APL provide sufficient protection capacity for the *MotL* drive and are connected to the inputs "*Permit*", "*Protect*" and "*Interlock*" of *MotL*. The interlock blocks have their own faceplates that can be selected via a separate button in the standard view of *MotL*. The bypass functions of *Permit16*, *Protect16* or *Interlock16* give the operator the opportunity to bridge the drive interlock and to maintain mandatory process sequences. This only applies in OS mode.

Figure 2-12



The reporting behavior was realized with two *EventTS* blocks. The *EventTS* blocks receive the operating and fault messages from the input drivers for drive monitoring in Sheet 5.

The locking function *Interlock* is conceptually similar to the *LOCK* connection type of older PCS 7 versions.

When the locking conditions are fulfilled, the drive goes into the safety position. If the locking conditions are no longer met, the drive can be restarted *without resetting the interlock*. A logical "1" at the inputs IN1...IN16 means the good state. Logical "0" means that interlocking is active.

The ON permission ("Permit = 1") enables the safety position of a drive to be exited through operator control or CFC/SFC interconnections at MotL. If the block is not in the safety position, the ON permission has no effect. The compulsory "Switch off" function is performed through an interlocking condition *("Protect = 0")* via the interlocking type *Protect*. After restoring the interlocking conditions ("*Protect = 1*"), a restart must be performed in the MANUAL mode at MotL (see *MotL* Feature Bit 31 = "1"). Resetting is also done with the Status Feature Bit 9 = "0" via the standard view of the *MotL* operating block or via the interconnectable input parameter in the CFC ("*RstLi=1*").

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Protect16

All the input signals at *Protect16* block are in a "good" status with signal "1" . If one of the input signals falls off ("0"), the drive is software-locked and at the same time the power output of the drive is enabled in hardware. The drive interlock only terminates when all the input signals are reset ("1") and after the lock is reset in the *MotL* standard view.

Motor protection

Engine protection (subplan A/Sheet 5) is connected to the input "In01" of the *Protect16* via the *PCS7DiIn* input driver "TripMMS".

Control fuse

The control fuse of the local control without AS (subplan A/Sheet 5) is connected to the input "In02" of *Protect16* via the *PCS7DiIn* input driver "TripCF".

Overheating / thermistor protection

Temperature rise/thermistor protection (subplan A/Sheet 5) is connected to input *"In03"* of *Protect16* via the *PCS7DiIn* input driver *OverTempProt_AH* .

Torque /chain / belt monitoring

The torque /chain / belt monitoring (subplan A/sheet 5) is connected via the *PCS7DiIn* input drive *Mech_Prot_AL* with the INPUT "*In04*" of *Protect16*.

Dry-run protection

The dry-run protection (subplan A/sheet 5) is connected via the *PCS7DiIn* input drive *PpProt_AL* with the input "*In05"* of *Protect16*.

Interlock16

All the input signals at *Protect16* block are in status good with signal "1". If one of the input signals falls off ("0"), the drive is software-locked and at the same time the power output of the drive is enabled in hardware. The drive interlock only terminates when all the input signals are present ("1") without reset of the lock in the *MotL* standard view.

Differential pressure / membrane monitoring

The differential pressure/membrane monitoring (subplan A / Sheet 5) is connected to the input *"In03"* of *Interlock16* via the *PCS7DiIn* input driver *ProcProtect_AH*.

Mains voltage monitoring

The mains voltage monitoring (subplan A / Sheet 5) is interconnected to the "*In04*" input of *Interlock16* via the *PCS7DiIn* input driver *NetPower_AL*.

Emergency stop button

The emergency stop switch (subplan A / Sheet 5) is connected to the input *"In05"* of *Interlock16* via the *PCS7DiIn* input driver *EmergStop*.

Local drive lock

The local drive lock (subplan A / sheet 3) is connected to the input *"In06"* of *Interlock16* via the OR block *Local_0_Pos_Event*.

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Motor overcurrent

The engine overcurrent (subplan A / sheet 5) is connected to the input *"UserAna1"* of the engine module *MotL* via the *AV* block.

Permit16

The Permit16 block is available for project- and task-specific release locks and must be optionally interconnected and switched on.

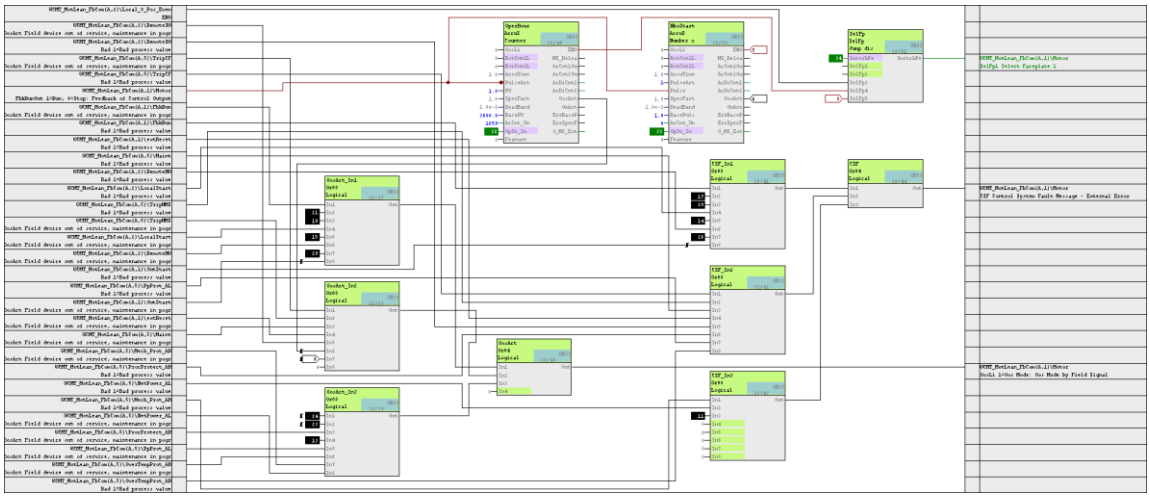
CAUTION	**Safety relevant regulations according to VDE 0100 /0105 or DGUV regulation 3 (German Statutory Accident Insurance) must not be invalidated with these functions described here. This must be always taken into consideration when creating the software.**

Note	Further information can be found in chapter 8 "Interlock blocks" of the function manual Process control system PCS 7 Advanced Process Library: https://support.industry.siemens.com/cs/ww/en/view/109760968/73974323339

2.1.4 CFC subplan A/sheet 4

Subplan A sheet 4 of *WCMT_MotLean_FbCom* provides a faceplate jump distributer, a block with operating hours count and a block for operating cycles count.

Figure 2-13



The output "*SwitchPe*" of *SelFp* (jump distributor) is connected to the input "*SelFp1*" on the *MotL* block. The *SelFp* block originates from the IL and, in addition to the uptime and number of start processes, provides the user with three additional selection options (drive functions and/or additional measurements) on *MotL*. The user can access the faceplate *SelFp* from the *MotL* standard view with the "Additional functions" button.

A benefit of this variant is the functional grouping of process technology-related components (e.g. pressure, flow, level and temperature measurements) and

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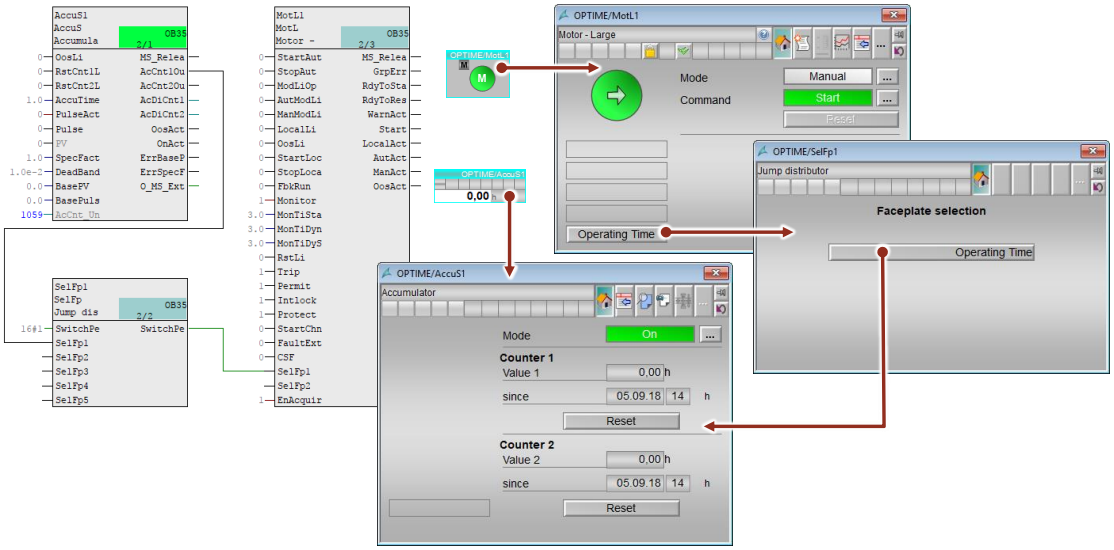
energy components (e.g. effective energy, effective power, apparent power, reactive power, cos phi, lead voltage) with equivalent AKS identification.

In addition, a block icon is eliminated for each function. This makes the process images clearer and increases system safety during operator input and monitoring of the process.

Note

The text for the button "Additional function" can be customized. This is done in the CFC at the MotL block under the properties of the connections "SelFp1" and "SelFp2" at the parameter "OS Additional Text". The same approach also applies to text changes in the SelFp block. Changed texts can only take effect and be displayed after the entire project has been compiled in MotL or the SelFp faceplate.

Figure 2-14



The *AccuS* (*OperHour*) operating hours counter from the APL records the operating time of *MotL* in two time intervals, e.g.:

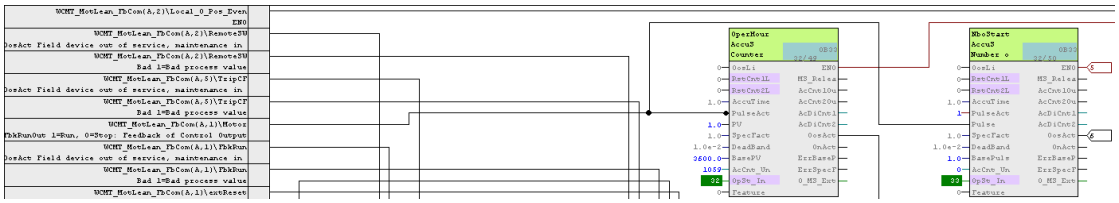
- A day counter (use within the last 24 hours)
- Long-term counter (use since start of first use)

Via the button "Operating hours" of the preview view of the MotL, the user reaches the parameters for operating and monitoring the operating hours.

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The operating cycles counter has been implemented with the *AccuS* (NboStart) block.
It detects every position change of the motors and valves.

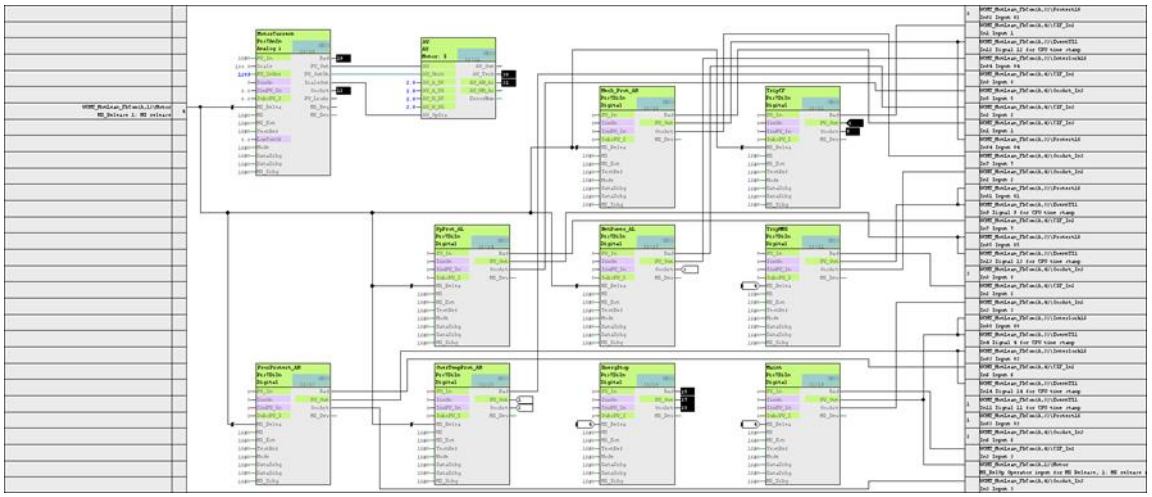
Figure 2-15



2.1.5 CFC subplan A/sheet 5

The drive monitoring (motor protection, control fuse, torque monitoring, chain and belt monitoring, filter monitoring and/or other special functions) including motor current recording with zero point suppression are implemented in subplan A sheet 5 of *WCMT_MotLean_FbCom*

Figure 2-16



Zero point suppression

In order to prevent a fluctuating engine current in the switched-off state, a zeropoint suppression is generated at the input driver PCS7DiIn block over a standard solution "LowCut" (FeatureBit = 1).

If the input value falls below 0.5, an offset = 0.0 = 0.0 ampere is applied. If the motor current exceeds at least 1.0 ampere (hysteresis = 1), the real value of the motor current is released again. Zero suppression can be deactivated as required via (FeatureBit 5 = 0).

The Wire break monitoring at the driver block is always active.

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Engine current monitoring

The downstream AV module extends MotL standard functions with the limit value view in the faceplate. The operator has the possibility to use additional operating and monitoring conditions for the engine current from the faceplate directly. The motor overcurrent is reported to the *MotL* block and interlocks the drive via the *Interlock16* interlock block .

Table 2-2

Contact	Block name	Function
HW: Contact	Maint	1/0 = maintenance switch ON/Maintenance_Service
HW: Contact	TripMMS	1/0 = engine protection ON/triggered
HW: Contact	TripCF	1/0 = Control fuse triggered
HW: Contact	EmergStop	1/0 = Emergency Stop not tripped/Emergency Stop tripped
HW: Contact	NetPower_AL	1/0 = Supply voltage OK/Supply fault in low-/medium-voltage distribution system
HW: Contact	Mech_Prot_AH	1/0 = Torque /Chain/Belt monitoring i.o./triggered
HW: Contact	PpProt_AL	1/0 = Dry-run protection i.o./triggered
HW: Contact	OverTempProt_AH	1/0 = temperature rise/thermistor protection i.o./triggered
HW: Contact	ProcProtect_AH	1/0 = Differential pressure/membrane monitoring i.o./triggered
Analog value	MotorCurrent	Limit value monitoring (>19mA): Engine overcurrent triggered

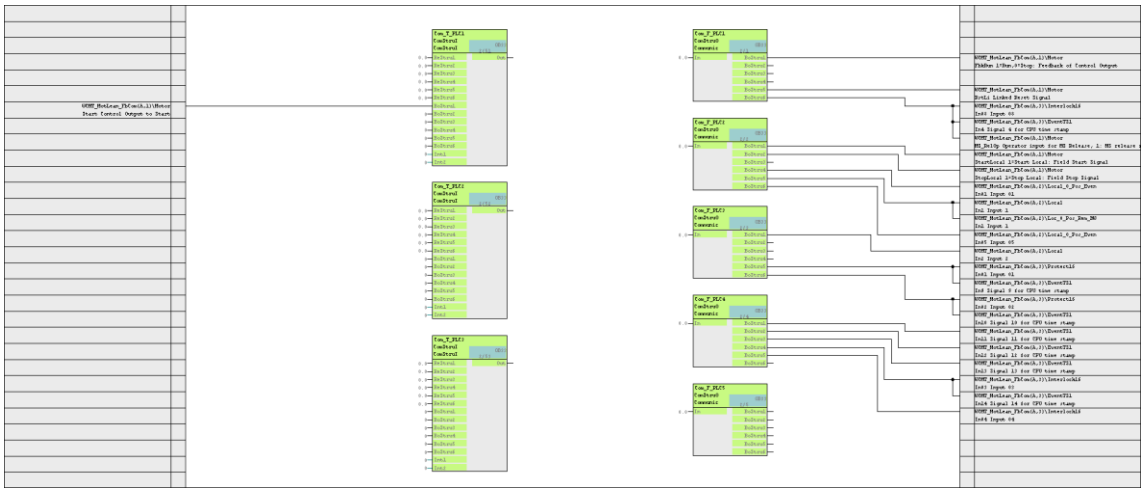
The signal from the channel driver *Maint* (maintenance/service) is connected via OR blocks to the *"OosLi"* connection of engine block *MotL* (sheet 1). In an fault-free state the signal delivers a "1" signal. When the repair switch is tripped, the *MotL* block switches off the drive and signals that it is out of operation. Incoming warnings, faults and operating messages are suppressed in this operating mode.

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2.1.6 CFC subplan A/sheet 6

The PCS 7 Water Templates keep the area in all subplans A sheet 6 for further communications expansions ready. In its design, this subplan is ready for local data exchange, serial connections, telecontrol or Package Units.

Figure 2-17



For PCS 7 Water Templates with the "_FbCom" designation, the Control Module is extended by one additional standardized local control station via a Package Unit communication.

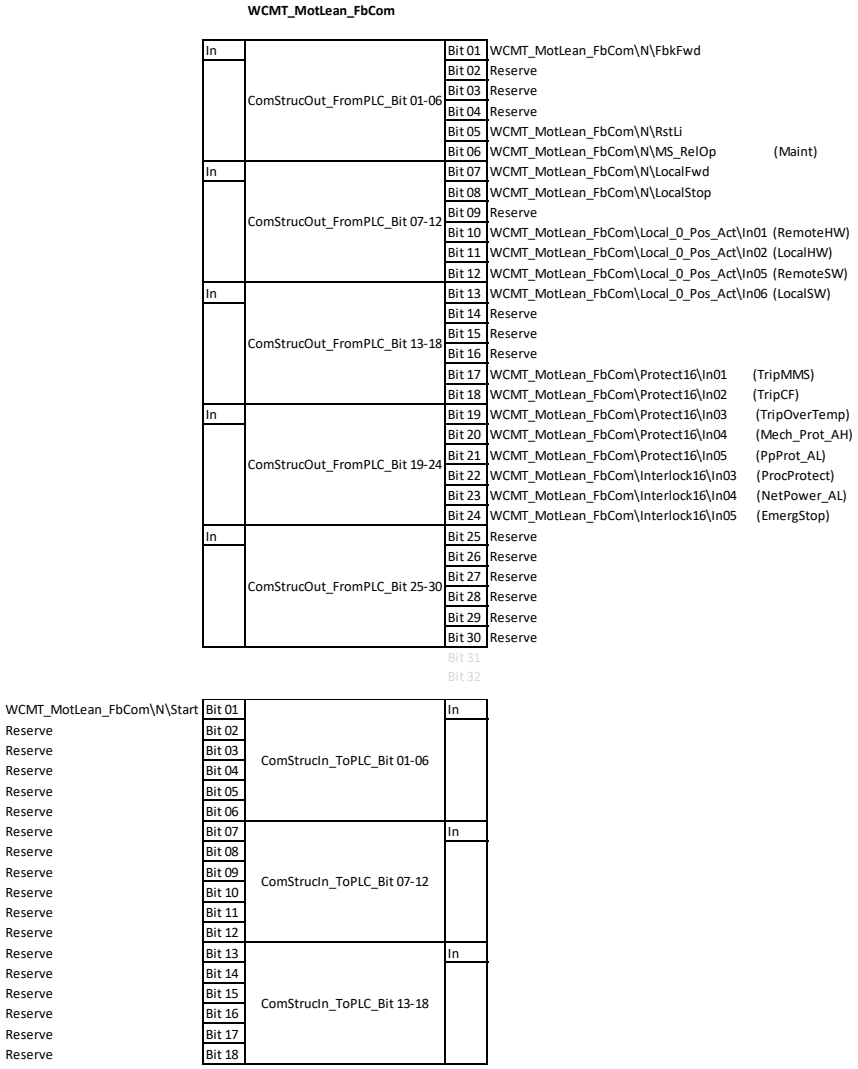
With the help of the connector block "ComStruIn" and "ComStruOut", all signals from the Control Module relevant for communication are grouped in a structure, or they are disassembled back into individual tags. The structures can then be interconnected via the "Out" output or the "In" input with the send/receive field of the communication method, for example Modbus/TCP.

Information for the connection to the package unit can be found in chapter:

1.9 Solutions for Package Unit connection

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Figure 2-18 Communication interface with the package unit

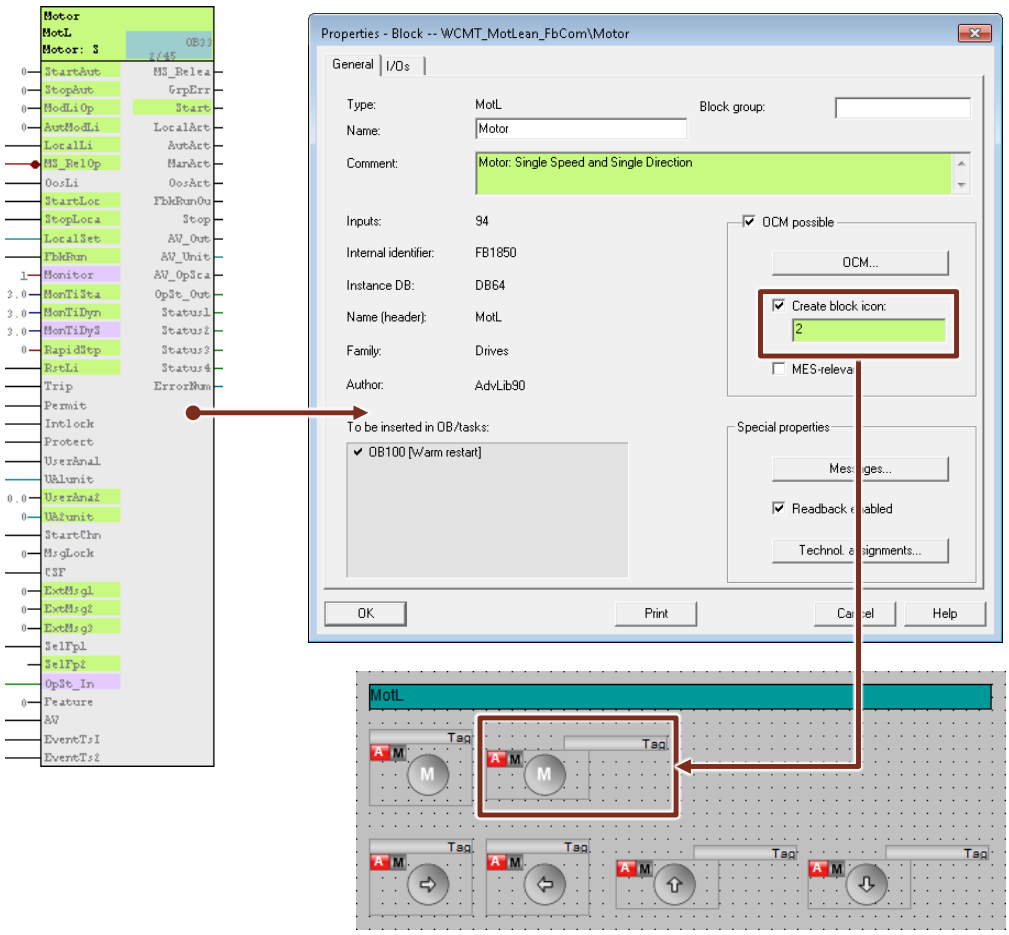


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2.1.7 WCMT_MotLean_FbCom OS faceplates and icons

Each control module type (WCMT) of the PCS 7 Water Templates receives only one icon on the OS for the technological core function, including the associated Panel icon if necessary (the latter is missing if the block is deselected or unavailable). The standard APL faceplates of *MotL* are used in *WCMT_MotLean* without changes. This pre-configured variant can be extended at any time to suit the specific task.

Figure 2-19



Note

The used faceplates and icons of WCMT_MotLean_FbCom are described in the corresponding profile. The profiles are part of this application example and you can obtain them from your regional sales partner.

In the chapter entitled 3 WCMT / (WEMT) profiles you will find the description of a profile using an example.

Further information on the standard PCS 7 OS faceplates and OS icons can be found in the function manual Process Control System PCS 7 Advanced Process Library:
https://support.industry.siemens.com/cs/ww/en/view/109750809

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2.1.8 WCMT_MotLean_FbCom panel faceplates/icons

The panel icons and faceplates form part of the PCS 7 Industry Library and unlike the PCS 7 OS, they are not provided automatically for the Control Module Types (WCMTs) of the PCS 7 Water templates.
The user creates the plant-specific images for the Panel/IPC operator input and monitoring separately via TIA Portal V14 SP1 Upd6 onward.

Note

The used faceplates and icons of WCMT_MotLean_FbCom are described in the corresponding profile. The profiles are part of this application example and you can obtain them from your regional sales partner.

In the chapter entitled 3 WCMT / (WEMT) profiles you will find the description of a profile using an example.

For further information and configuration aids relating to Panel integration, refer to the article: "Integration of Operator Panels in SIMATIC PCS 7 with the Industry Library"
https://support.industry.siemens.com/cs/ww/en/view/50708061

or the Industry Library manual for PCS 7:
https://support.industry.siemens.com/cs/ww/en/view/109750809

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2.2 WCMT_MotLean_FbMMS02 Template

The *WCMT_MotLean_FbMMS02* example describes the water-specific functions of a SIMOCODE pro V with field bus connection (PROFIBUS DP) via the APL driver block *FbSwtMMS* for a drive function with one direction of rotation and one speed.

The example is applicable to all further templates with a signal connection of the same "_FbMMS02" name, and also applies in principle for the field bus connection with PROFINET.

The Function Manual SIMOCODE pro - Communication describes in detail the communications configuration for a SIMOCODE pro V (PN) with PROFINET.

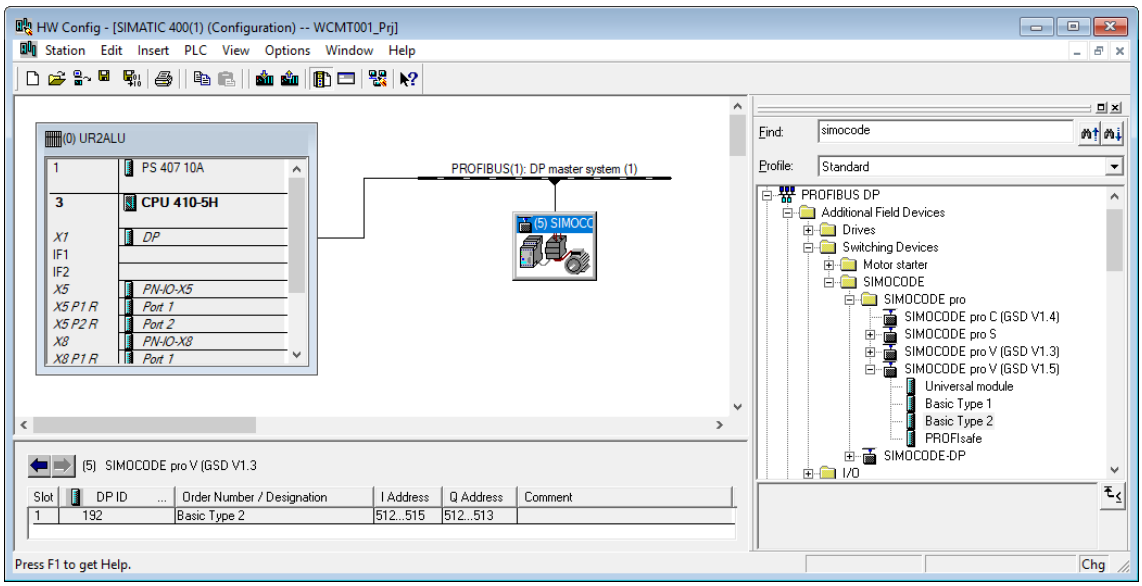
https://support.industry.siemens.com/cs/ww/en/view/109743960

This PCS 7 Water Template only differs from the previously described *WCMT_MotLean_FbCom* template in subplan A sheet 1 and sheet 5. This chapter describes those differences in detail. *WCMT_MotLean_FbMMS02* uses the base type 3 (telegram type) between SIMOCODE pro V PN and the automation via PROFINET

Base types 1 and 2 are supported by SIMOCODE, but are only used in the context of the *WCMT_MotLean_FbMMS02* example with PROFIBUS DP. The following figure shows the standard hardware catalog in the HW config. The SIMOCODE Pro V with base type 2 is connected to the AS at the PROFIBUS DP Master System.

In the telegram structure of base type 2, the SIMOCODE Pro V contains four bytes of input data and two bytes of output data. These are used as an interface to the channel block *FbSwtMMS*.

Figure 2-20



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In the hardware configuration, the communications integration of SIMOCODE pro V (PN) should be carried out for PROFIBUS DP and PROFINET with GSD(L).

For SIMOCODE pro V PN with PROFINET, only base type 3 is used in the Water Templates. With 20 bytes of input data and 6 bytes of output data, the maximum cyclical data exchange is utilized. In the first 4 bytes of input data and 2 bytes of output data, base types 2 and 3 are identical. Starting from byte 5 until byte 19, base type 3 provides the following information, supplemental to the *FbSwtMMS* channel block, via peripheral addressing:

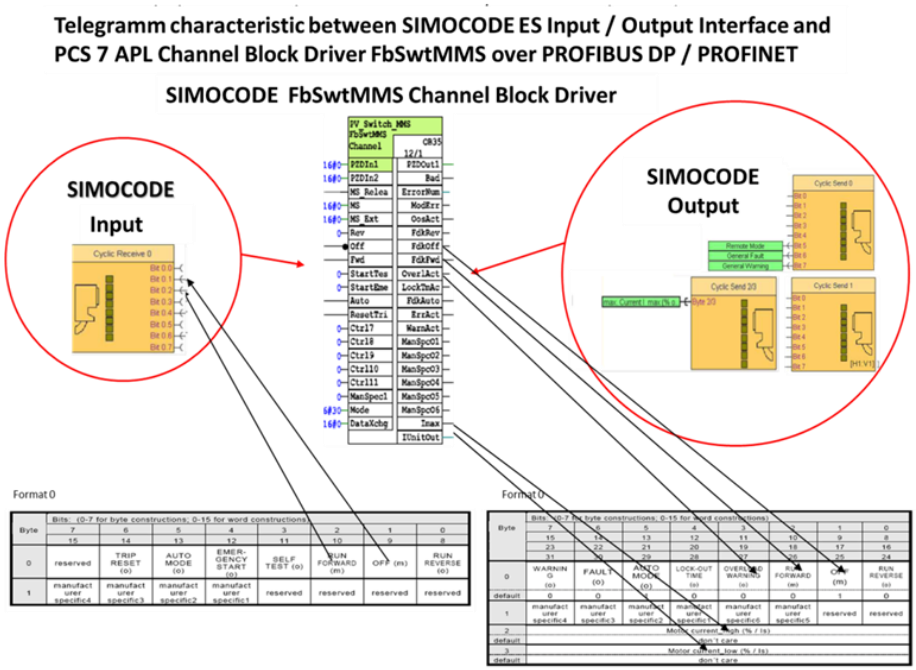
- Motor temperature in [°C]
- cos phi
- Active power in [W]
- Apparent power in [VA]
- Effective energy in [kWh]
-

The SIMOCODE measured values provided have been created for the SIMOCODE WCMT **as an example** and can be modified project-specifically. For instance, you can swap out the effective energy parameter for the operating hours parameter.

In addition, you must modify the included SIMOCODE device parameters and the WCMT.

The following figure gives a **schematic** description of the input/output interfaces of SIMOCODE pro V ES and the channel block *FbSwtMMS*. SIMOCODE pro V contains the telegram structure of the "base type 2" with 4 bytes of input and 2 bytes of output data.

Fig. 2-21


Telegramm characteristic between SIMOCODE ES Input / Output Interface and PCS 7 APL Channel Block Driver FbSwtMMS over PROFIBUS DP / PROFINET
SIMOCODE FbSwtMMS Channel Block Driver
SIMOCODE Input
SIMOCODE Output
Format 0
Format 0

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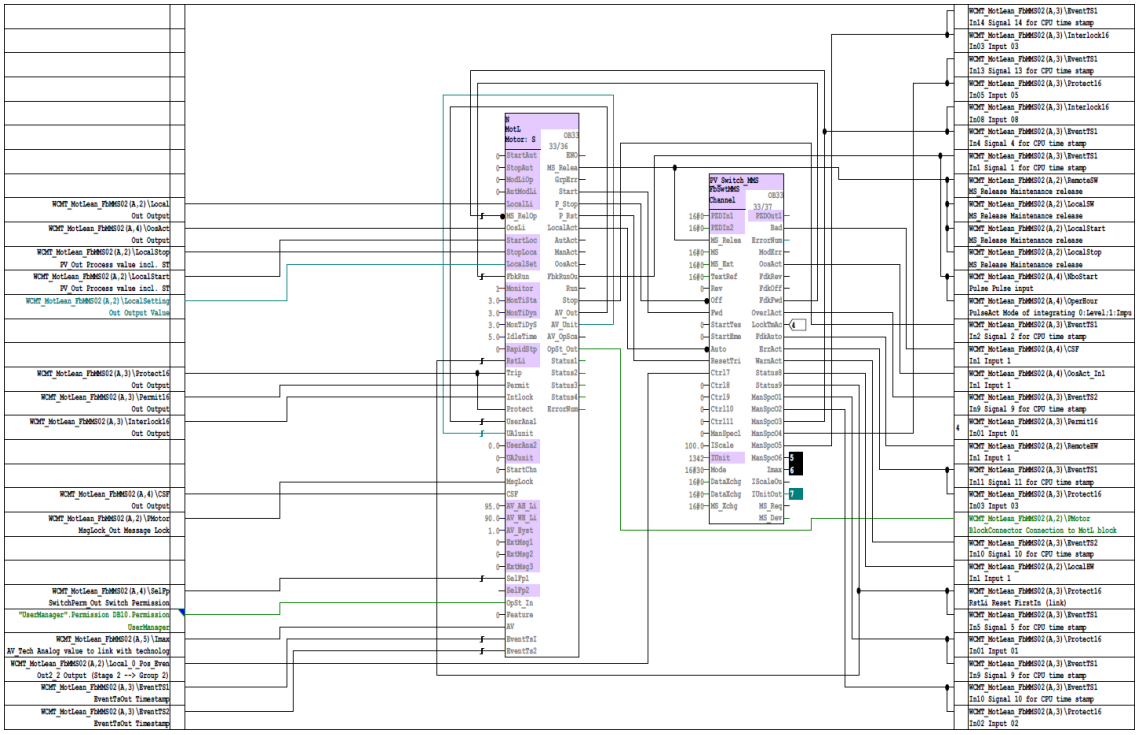
Note

A detailed description of the interface for the standard block FbSwtMMS can be found in chapter 15.7 of the PCS 7 Advanced Process Library (APL) manual:
https://support.industry.siemens.com/cs/ww/en/view/109760968/73974323339

For further information on the connection with PROFIBUS DP, please refer to chapter 12, "Communication" of the "SIMOCODE pro V PB" manual:
https://support.industry.siemens.com/cs/ww/en/view/20017780

2.2.1 CFC subplan A sheet 1

Figure 2-22



In subplan A sheet 1, *WCMT_MotLean_FbMMS02* provides a SIMOCODE pro V drive function with one direction of rotation and one rotation speed via the field bus driver block *FbSwtMMS* of the APL. In doing so, the driver block *FbSwtMMS* supplies/removes the *MotL* cyclically with the SIMOCODE pro V input/output peripherals via Send and Receive Telegrams.

The technological core functions of *WCMT_MotLean_FbMMS02* are identical to the template *WCMT_MotLean_FbCom* except for two details:

1. The first difference to the template *WCMT_MotLean_FbCom* chapter 1.5 subplan A sheet 1 is the field bus driver block *FbSwtMMS*.
2. The additional provision of engine current (I_{max}) in [%] or [A] from SIMOCODE pro V to the automation system. This analog value is described in detail as a special function in *WCMT_MotLean_FbMMS02* subplan A sheet 5. The conversion from percent to Amperes is carried out using a two-point equation with the *Exchange* block. The user must parameterize via *LowScale* and *HighScale* each measurement start and end value and also parameterize the respective unit via the *SelUnit* block.

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2.2.2 CFC subplan A sheet 2

The configuration matches that of WCMT_MotLean_FbCom. Further information can be found in chapter: 2.1.2 CFC subplan A/sheet 2

Figure 2-23 First-generation local control stations

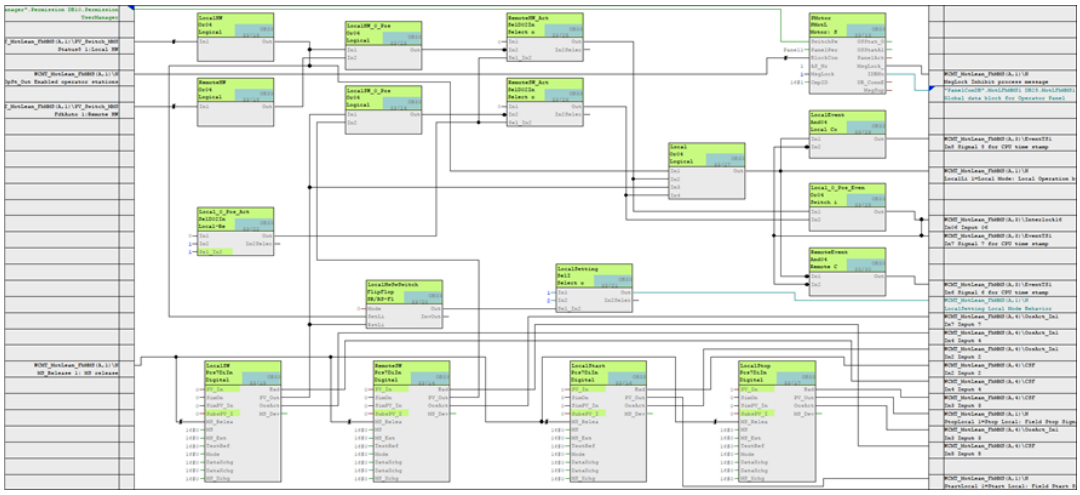
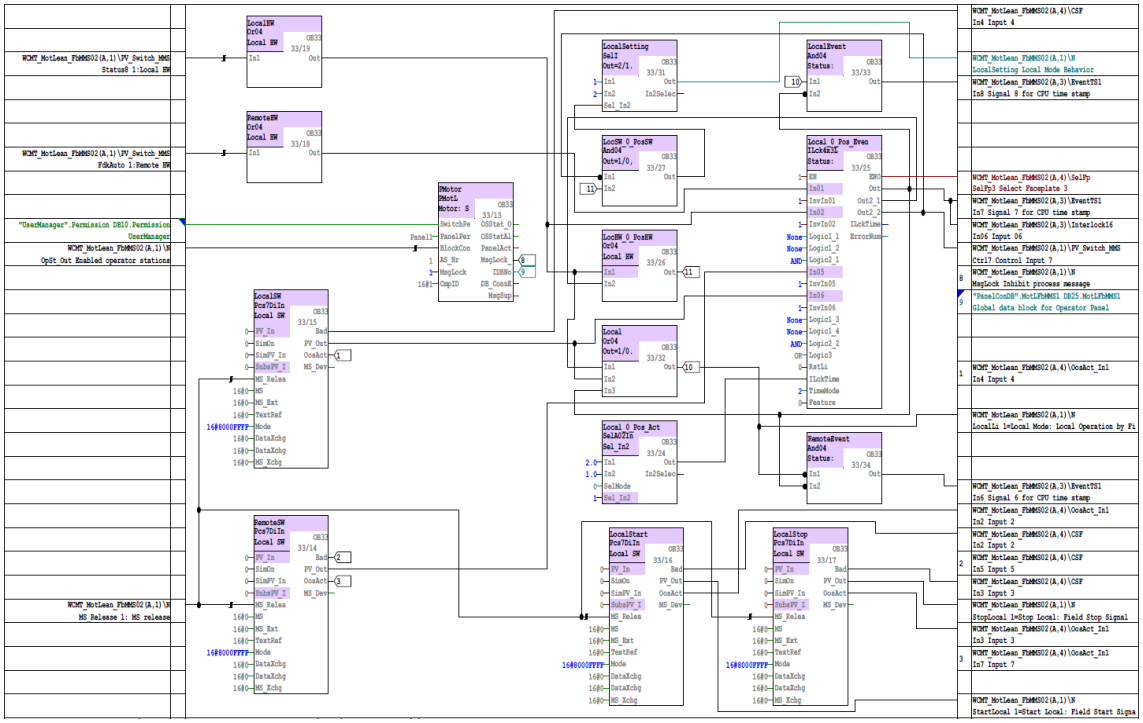


Figure 2-24 Second-generation local control stations



After activation by a key switch, the local on-site operation considers a switchover between on-site, remote and a neutral intermediate position (local - 0 - remote).

With the simultaneous use of both variants of local control (LocalSW + LocalHW), the hardware-based control (LocalHW) has more often priority over the software-based control (LocalSW).

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Exceptional case

Independent from the local switch position "LocalHW", if you put the the local on-site operation "LocalSW" switch to the neutral intermediate position "(0-Pos) = drive lock", the drive lock get automatically the higher operator authorization.



WARNING

Important safety warning:

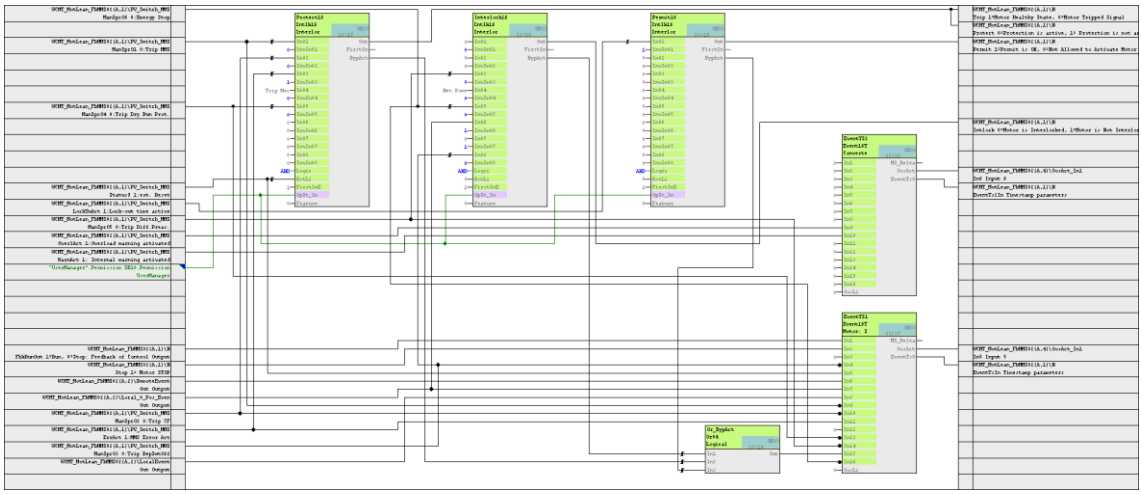
In order that the previously described drive lock "LocalSW = 0-Pos" to be effective in hardware-based control circuit of the drive, it must be additionally locked via a digital output on the SIMOCODE (Local Locked) by a relay contact on the basic unit (GG) or alternatively with an auxiliary relay. (see examples on pages 60 and 68). If this is not taken into account, it is possible to operate the drive via LocalHW with the on/off buttons in the control circuit despite the upcoming LocalSW drive lock.

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2.2.3 CFC subplan A sheet 3

The description matches the description of WCMT_MotLean_FbCom. Further information can be found in chapter: 2.1.3 CFC subplan A/sheet 3

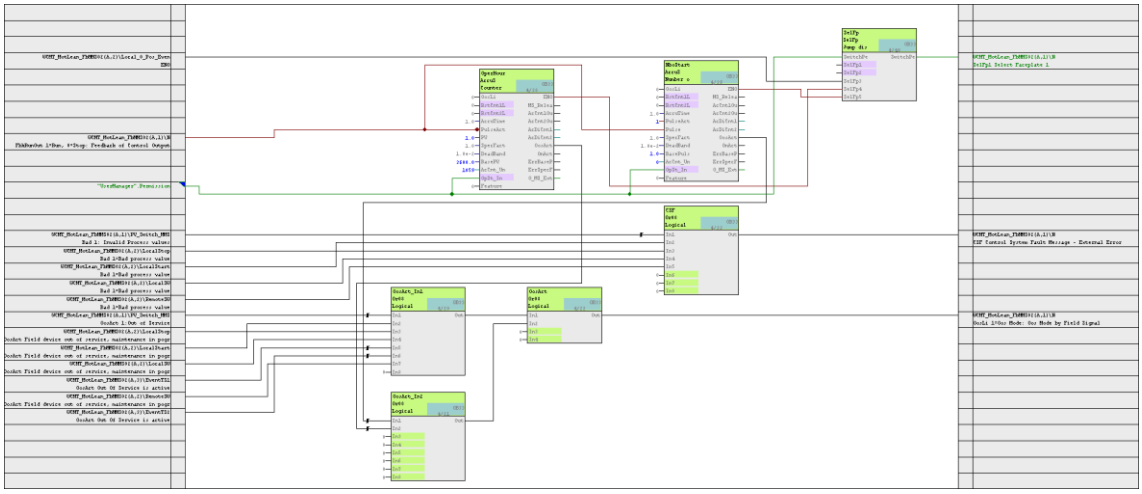
Figure 2-25



2.2.4 CFC subplan A sheet 4

The description matches the description of WCMT_MotLean_FbCom. Further information can be found in chapter: 2.1.4 CFC subplan A/sheet 4

Figure 2-26

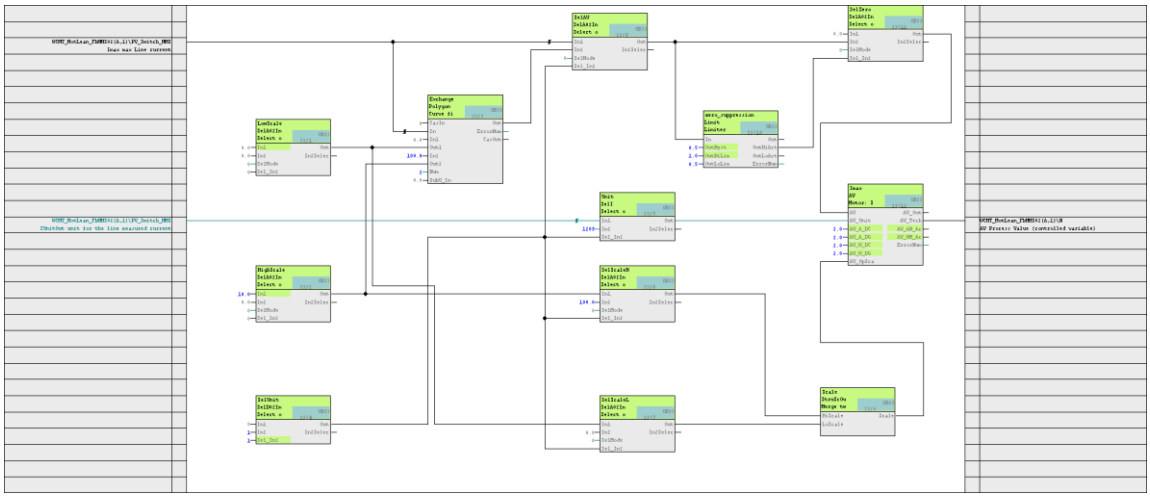


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2.2.5 CFC subplan A sheet 5

In subplan A sheet 5 of *WCMT_MotLean_FbMMS02,* the transmitted analog value *"Motor current"* is provided in the *Exchange* block either in [%] (SIMOCODE default) or in a scalable measuring range, e.g. 0-10A, via a two-point equation. The two-point equation can be programmed and must be adapted to a measuring range for specific projects.

Figure 2-27



A programmable delay time suppresses an alarm in the event I_{max} is briefly exceeded (chatter suppression). If this time is exceeded and the value is still > I_{max}, an alarm message is generated.

An additional zero point suppression can also be activated as an offset (0.0 A). The offset suppresses a measured-value drift < 0.0 A.

If the connected transmitter (4...20mA) falls below the value of <3.8mA, an alarm message "wire break" is still generated for the analog channel, despite the activated offset. This function is optional and can be configured according to the plant or removed in the WCMT.

In *WCMT_MotLean_FbMMS02* subplan A sheet 1, the motor current (I_{max}) is interconnected with *MotL* via "*AV*". An additional Limit View is also provided for it in *MotL*.

Depending on the programmable pre-selection in the *Exchange* block, the unit [%] or [A], including the measuring range start/end and four configurable limits are displayed for the motor current (I_{max}).

2.2.6 CFC- subplan A sheet 6

There is no interconnection included in subplan A sheet 6 of WCMT_MotLean_FbMMS02. This subplan can be used for communication or for special functions.

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2.2.7 Use of SIMOCODE in connection with Package Units

In connection with a Package Unit, a SIMOCODE drive is always connected to the Package Unit as a field bus subscriber (PB or PN).

This communication method always ensures a high availability via the Package Unit CPU, even in emergency mode. If the Package Unit has a data connection with the PCS 7 CPU, the WCMTs with the "_FbCom" designation carry out data provision/removal for the respective instance and not via the WCMTs with the identifier "_FbMMS 02".

2.2.8 Drive parameter assignment with SIMOCODE ES (TIA Portal)

The functional diagram of the SIMOCODE pro V gives an overview of the final drive parameter assignment with interfaces for hardware and software.

The SIMOCODE is hardware-connected via the inputs of the digital modules DM1 and DM2. The power contactor for the drive is switched via the function block (FB) SIMOCODE basic unit (GG) outputs. The drive status messages are output to the signal LED via the output of the DM1 digital module.

An extension of the SIMOCODE with a SIMOCODE operating panel and/or a OPC UA is possible at any time. For this, the SIMOCODE device parameterization must also be adapted.

In terms of software, the function block Cycl.Control 0 in SIMOCODE pro V receives the control commands from the PCS 7 driver block *FbSwtMMS* via the communications connection.

Table 2-3

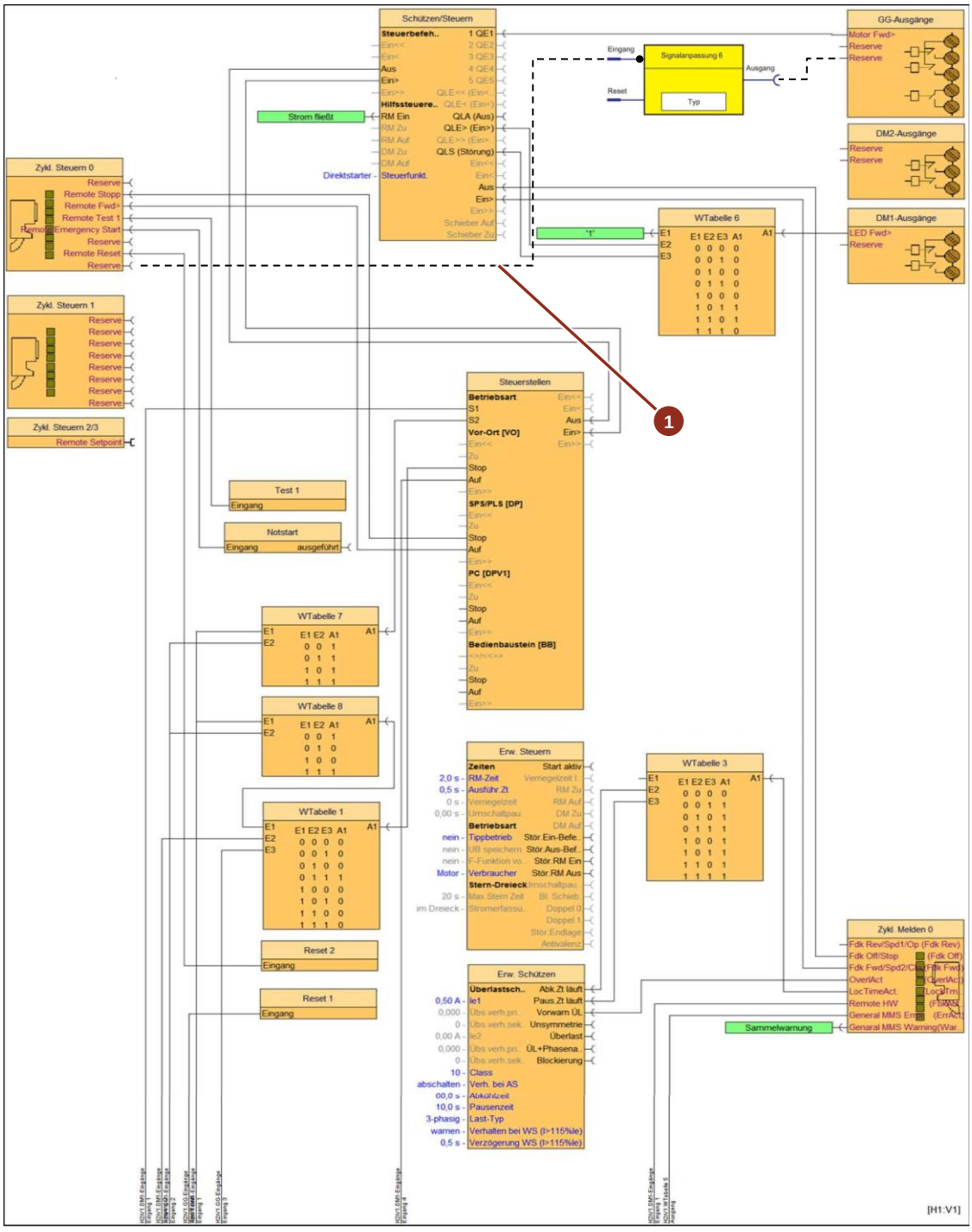
Input tag FbSwtMMS	Communication	SIMOCODE Cycl.Control 0
Rev	➔	Command Rev/Close/Fwd>>
Off	➔	Command Off/Stop
Fwd	➔	Command Fwd/Open/Fwd>
StartTest	➔	Command StartTest
StartEmerg	➔	Command StartEmerg
Auto	➔	Command Remote
ResetTrip	➔	Command ResetTrip
Ctrl7	➔	Command Local

Conversely, the most important drive signals or motor current (Imax) of the SIMOCODE are transmitted via the function blocks Cycl.Control 0...3 to the PCS 7 driver block *FbSwtMMS*.

Note For additional information, please refer to the SIMOCODE manual collection: https://support.industry.siemens.com/cs/ww/en/view/109743951

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Figure 2-28 Direct starter PROFIBUS DP



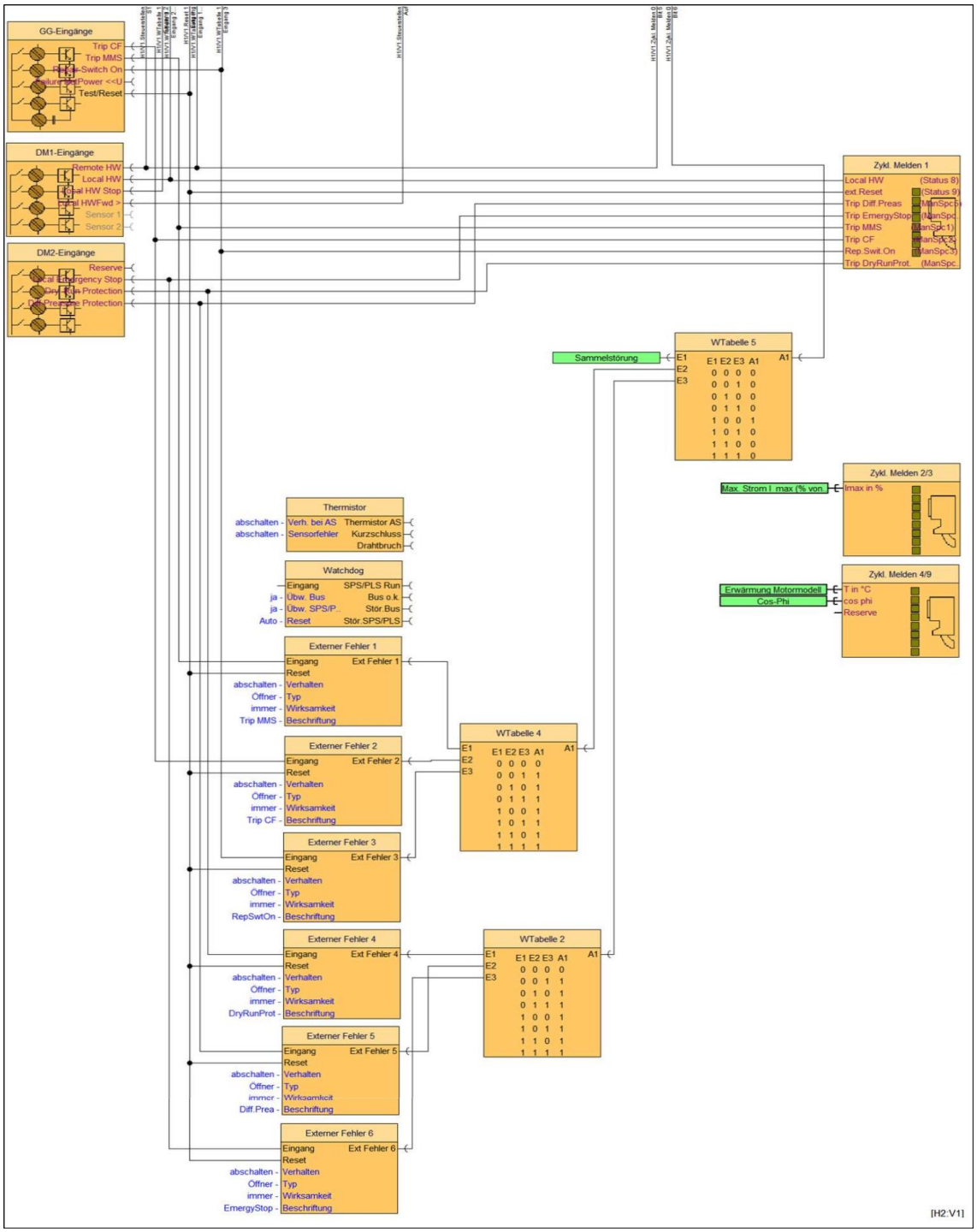
1* Example: Integration of relay contact GG Out3 "Local Locked", only when using "LocalSW-0-Pos" via PCS 7 control command Crtl7 = cycl. Control 0, bit 7

For more details see:

Circuit diagram for SIMOCODE pro V / (PN) with PROFIBUS / (PROFINET)
Chapter: 2.2.12

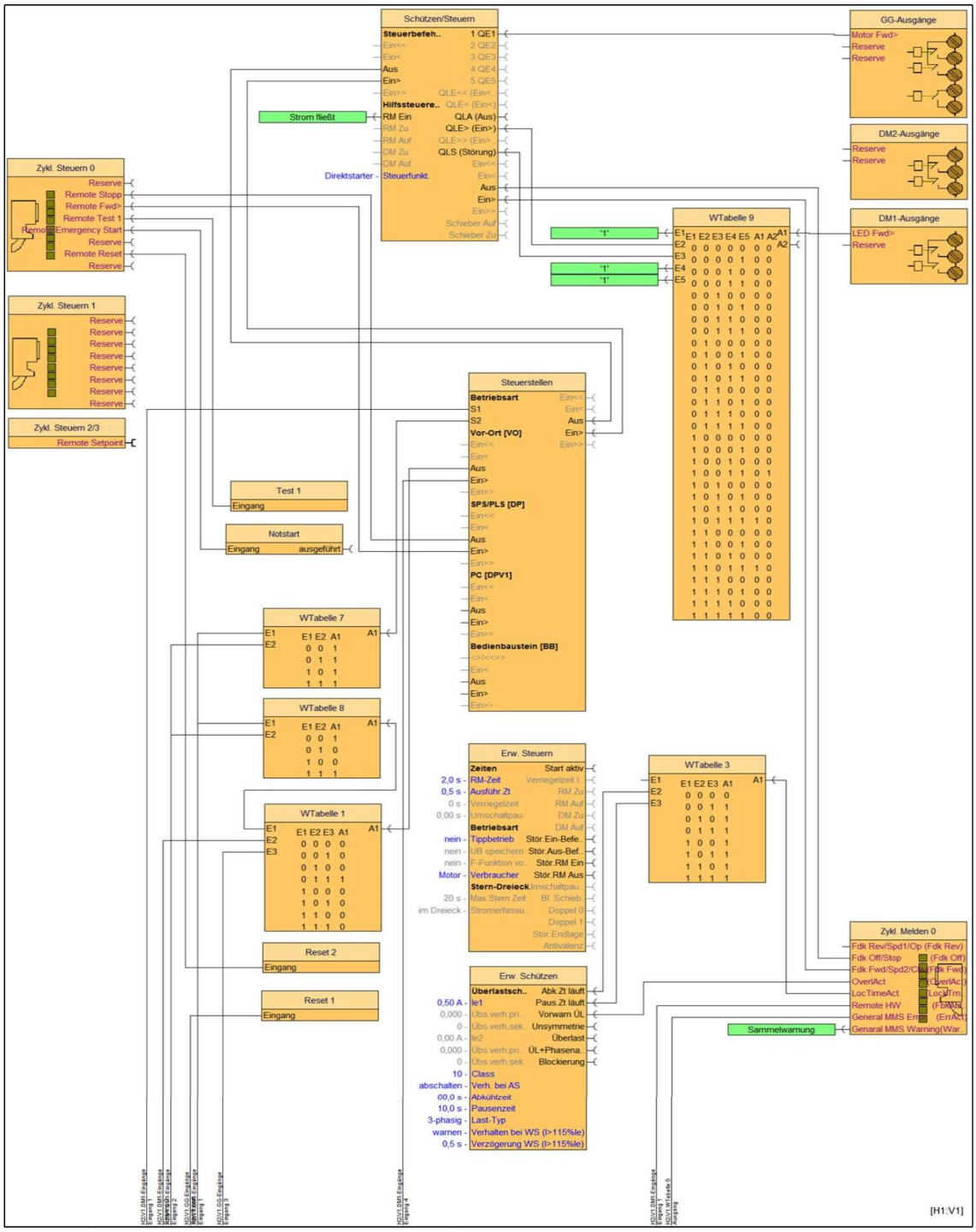
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Figure 2-29 Direct starter PROFIBUS DP



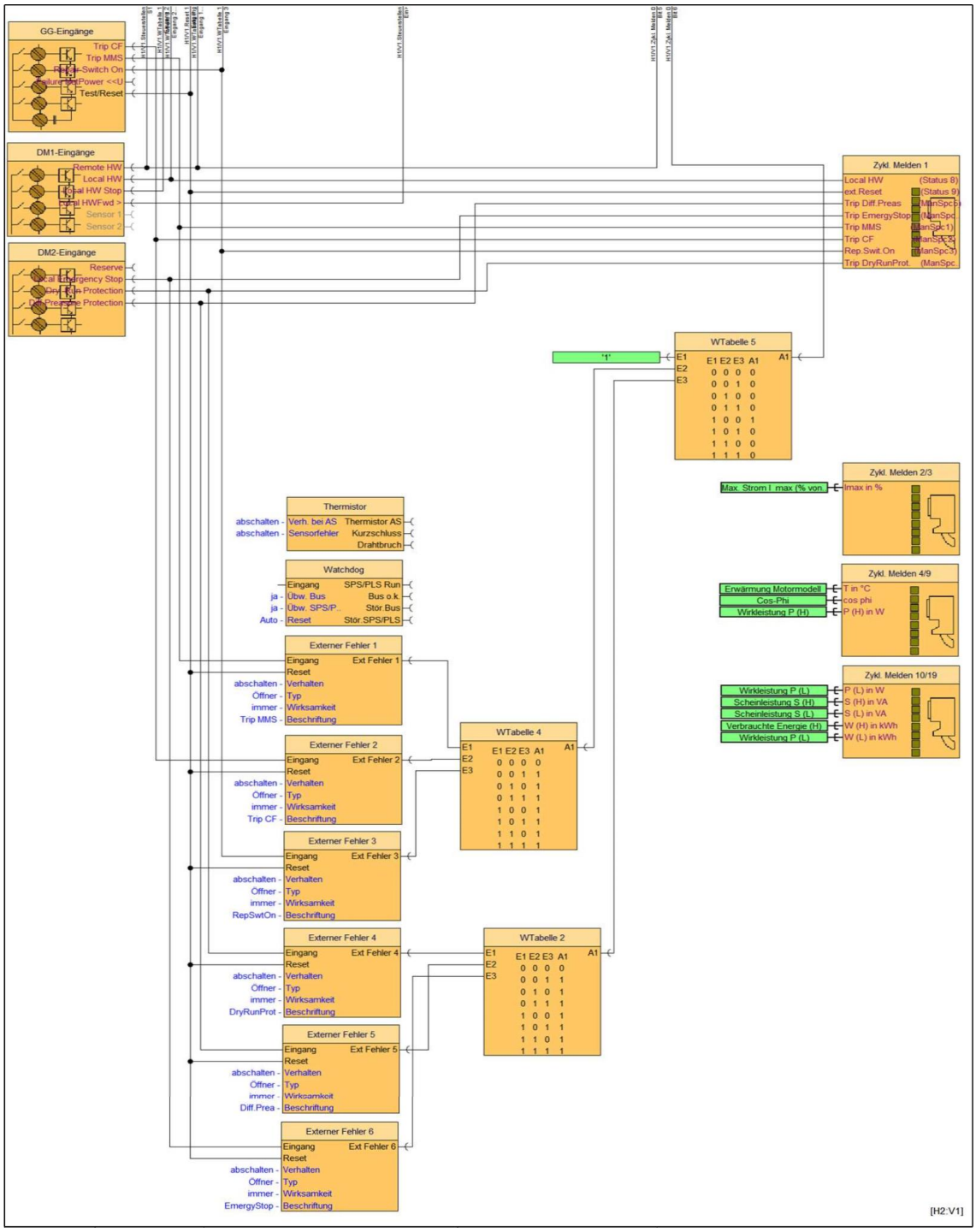
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Figure 2-30 Direct starter PROFINET



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Figure 2-31 Direct starter PROFINET



The local control point (three-point operation) on the SIMOCODE is activated via a switch with normally open contact (location 0 = remote).

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The signals are transmitted to the SIMOCODE via the inputs of digital module 1 (DM1) IN1 and IN2. After internal further processing in the logic of the SIMOCODE, the signals RemoteHW and LocalHW are transmitted via the communication blocks "Cycle". Report 0/1" sent to PCS 7. Cyclically updated output occurs at the output signals "FbkAuto" and "STATUS8" of the APL interface block *FbSwtMMS.*

Table 2-4

SIMOCODE Cycl. MSG 0	Communication	FbSwtMMS output variable
FbkRev	➔	FbkRes/FbkClosed/Fwd>>
FbkOff	➔	FbkOff/Stop
FbkFwd	➔	FbkFwd/FbkOpen/Fwd>
OverIAct	➔	OverIAct
LockTmAct	➔	LockTmAct
RemoteHW	➔	FbkAuto
MMSErrAct	➔	ErrAct
InternalWarnAct	➔	WarnAct

Table 2-5

SIMOCODE Cycl. MSG 1	Communication	FbSwtMMS output variable
LocalHW	➔	Status08
External reset	➔	Status09
TripDiff.Preas [2]	➔	ManSpec05
TripEmergStop	➔	ManSpec06
TripMMS	➔	ManSpec01
TripCF	➔	ManSpec02
TripRepSwtOff	➔	ManSpec03
TripDryRun [3]	➔	ManSpec04

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[2] For Vlv and VlvMot, replaced by Torque monitoring off
[3] For Vlv and VlvMot, replaced by Torque monitoring on

Table 2-6

SIMCOCODE Internal		
Channel diagnostics PB	↳	OoS_Act
Channel diagnostics PB	↳	ModErr

1. The activation of the maintenance switch on SIMOCODE is also carried out via a switch with NO contact (maintenance switch ON/maintenance switch OFF -> Maintenance = 1/0). The signal is transferred to the "GG inputs" software module via the hardware connection IN3 on the SIMOCODE. The output "Maint" from GG inputs is interconnected with SIMOCODE ES and the communication block "Cycl. Report 1" with input variable "TripRepSwtOff". The standard telegram provides this external signal cyclically at the PCS 7 driver FbSwtMMS via the output tag "ManSpec03".

2. The integrated RESET button on the SIMOCODE is activated via a normally open contact (RESET ON/RESET OFF = 1/0). The signal is transferred to the "GG inputs" software module via the internal IN5 connector on the SIMOCODE. The output "Test/Reset" of "GG inputs" of the SIMOCODE is connected via the internal logic with the communication block "Cycle Signal 1" with the input variable "ext.Reset". The standard telegram provides this signal cyclically at the PCS 7 APL driver block FbSwtMMS via the output tag "Status09".

Optionally, the controls and the associated feedback messages can also be done by means of pushbuttons/switches or indicator lights. However, this requires a re-parameterization with SIMOCODE ES V14 SP1 Upd6 (TIA Portal) or higher (license required). The "ON/OFF" connections from the function block "Control points" to the function block "BB keys" are deleted and connected to the I/Os of the function block "GG inputs". The feedback signals QLE/QLA of the function block "Protect/Control" must be interconnected from the function block "BB-LED" to the function block "GG outputs" or to an additional SIMOCODE output module.

Note

You can access a trial version of SIMOCODE ES V14 SP 1 (TIA Portal) in the following article:

https://support.industry.siemens.com/cs/ww/en/view/109745869

Project planning of direct starters with the APL channel block "FbSwtMMS" in SIMATIC PCS 7:

https://support.industry.siemens.com/cs/ww/en/view/64182525

SIMOCODE pro System Manual:

https://support.industry.siemens.com/cs/ww/en/view/109743957

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2.2.9 Activation of local/remote switching with SIMOCODE ES (TIA Portal)

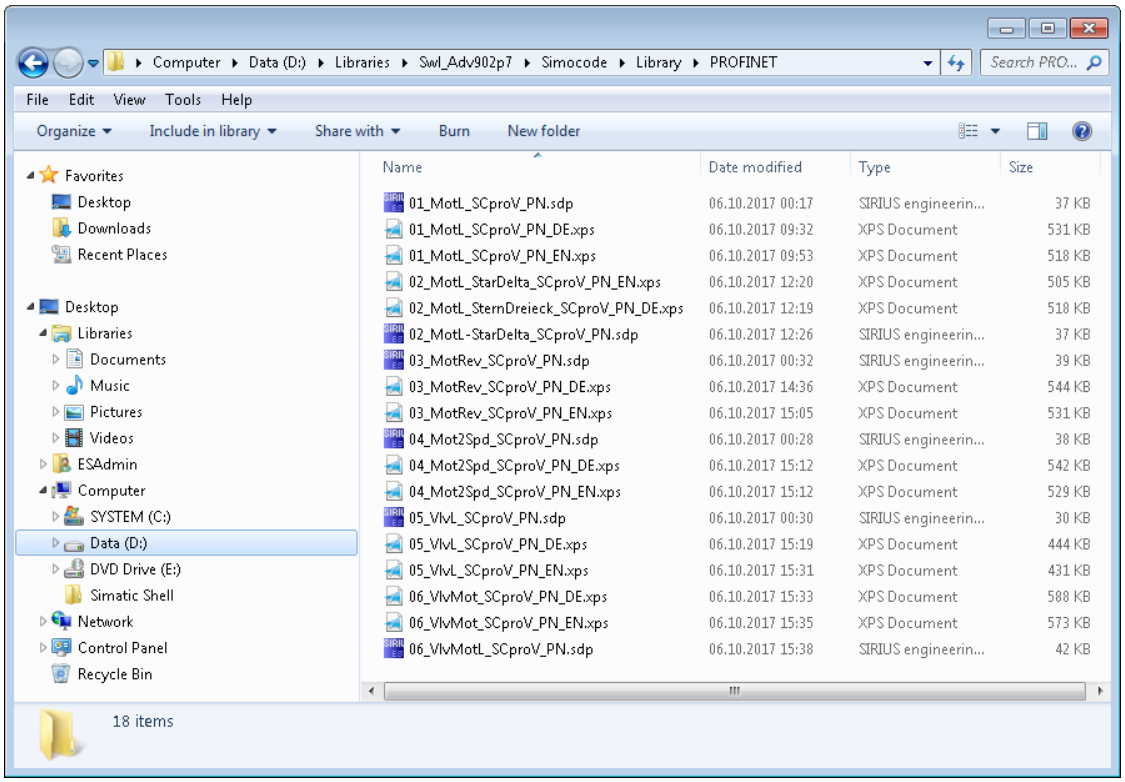
The parameterization of the local control station switchover S1/S2 at control station FB (HW Local/0/ Remote) is carried out with the engineering tool SIMOCODE ES V14 SP1 Upd6 (TIA Portal).

2.2.10 SIMOCODE ES (TIA Portal) drive parameter entry

The PCS 7 Water Templates also provide the suitable drive parameterizations for SIMOCODE ES V14 SP1 Upd6 (TIA Portal) for each template with SIMOCODE Pro V connection.

The project files for SIMOCODE ES are stored in the folders "…\Swl_Adv901p7\Simocode\Library\PROFIBUS\" and "…\Swl_Adv901p7\Simocode\Library\PROFINET\". Parameters are entered for the drives MotL, Mot2Spd, MotRev, Vlv und VlvMot.

Figure 2-32


Computer ▸ Data (D:) ▸ Libraries ▸ Swl_Adv902p7 ▸ Simocode ▸ Library ▸ PROFINET
Search PRO...
File Edit View Tools Help
Organize Include in library Share with Burn New folder
Favorites
Desktop
Downloads
Recent Places
Desktop
Libraries
Documents
Music
Pictures
Videos
ESAdmin
Computer
SYSTEM (C:)
Data (D:)
DVD Drive (E:)
Simatic Shell
Network
Control Panel
Recycle Bin
Name
Date modified
Type
Size
01_MotL_SCproV_PN.sdp 06.10.2017 00:17 SIRIUS engineerin... 37 KB
01_MotL_SCproV_PN_DE.xps 06.10.2017 09:32 XPS Document 531 KB
01_MotL_SCproV_PN_EN.xps 06.10.2017 09:53 XPS Document 518 KB
02_MotL_StarDelta_SCproV_PN_EN.xps 06.10.2017 12:20 XPS Document 505 KB
02_MotL_SternDreieck_SCproV_PN_DE.xps 06.10.2017 12:19 XPS Document 518 KB
02_MotL-StarDelta_SCproV_PN.sdp 06.10.2017 12:26 SIRIUS engineerin... 37 KB
03_MotRev_SCproV_PN.sdp 06.10.2017 00:32 SIRIUS engineerin... 39 KB
03_MotRev_SCproV_PN_DE.xps 06.10.2017 14:36 XPS Document 544 KB
03_MotRev_SCproV_PN_EN.xps 06.10.2017 15:05 XPS Document 531 KB
04_Mot2Spd_SCproV_PN.sdp 06.10.2017 00:28 SIRIUS engineerin... 38 KB
04_Mot2Spd_SCproV_PN_DE.xps 06.10.2017 15:12 XPS Document 542 KB
04_Mot2Spd_SCproV_PN_EN.xps 06.10.2017 15:12 XPS Document 529 KB
05_VlvL_SCproV_PN.sdp 06.10.2017 00:30 SIRIUS engineerin... 30 KB
05_VlvL_SCproV_PN_DE.xps 06.10.2017 15:19 XPS Document 444 KB
05_VlvL_SCproV_PN_EN.xps 06.10.2017 15:31 XPS Document 431 KB
06_VlvMot_SCproV_PN_DE.xps 06.10.2017 15:33 XPS Document 588 KB
06_VlvMot_SCproV_PN_EN.xps 06.10.2017 15:35 XPS Document 573 KB
06_VlvMotL_SCproV_PN.sdp 06.10.2017 15:38 SIRIUS engineerin... 42 KB
18 items

Note Previously configured SIMOCODE projects, e.g. those with SIMOCODE ES 2007 Upd9, can also be converted with system support using SIMOCODE ES V14 SP1 Upd6 (TIA Portal) or higher. Additional detail can be found in the following articles:
https://support.industry.siemens.com/cs/ww/en/view/109753966

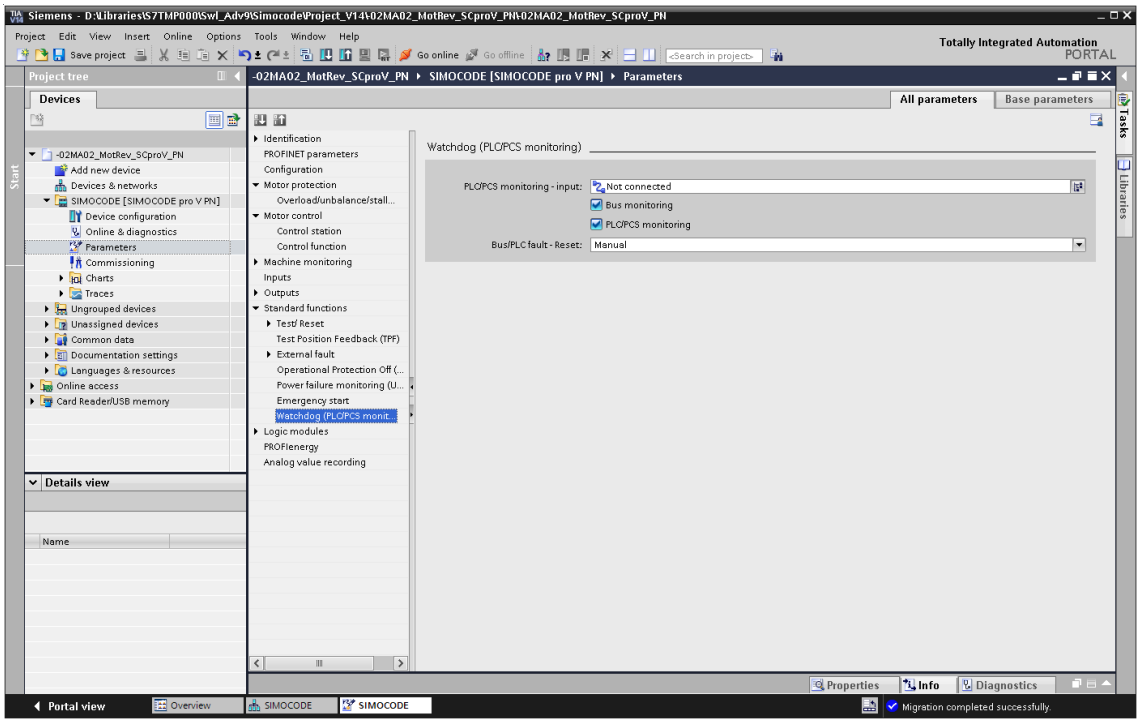
https://support.industry.siemens.com/cs/ww/en/view/109753874

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2.2.11 Parameterization of bus monitoring with SIMOCODE ES (TIA Portal)

For active communication monitoring between AS and SIMOCODE via PROFIBUS DP, the parameterization must be observed as shown in the following figure.

Figure 2-33

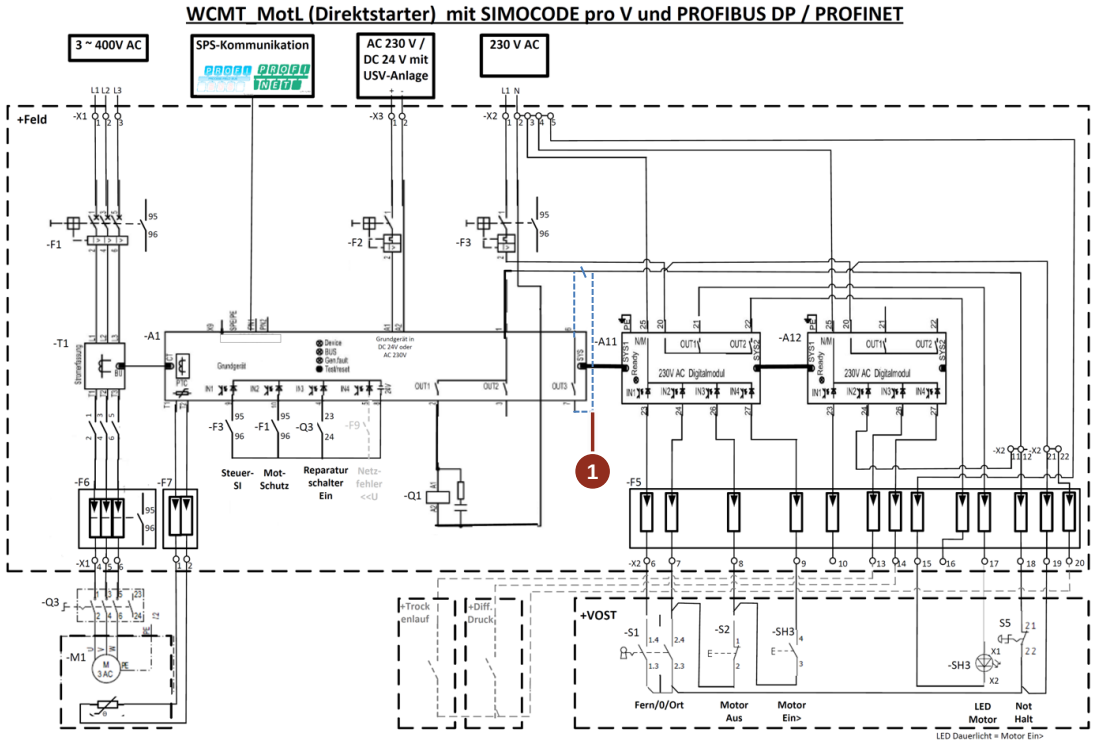


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2.2.12 Circuit diagram for SIMOCODE pro V / (PN) with PROFIBUS / (PROFINET)

The circuit diagram below shows the hardware connection of the local on-site operation with PROFIBUS/PROFINET.

Figure 2-34



1 * Integration of the additional relay contact GG Out3 in the control circuit when using "Local Locked"

Local operation is activated via the key switch (-S1 pos.2). For maintenance and service work on the engine, the repair switch is handed over to the *MotL* as a *Maint* function to enable the drive.
The local operation, after activation by a key switch (-S1), takes into account a switchover between local, drive inhibit and remote (local / 0 / remote).
The actuator is switched on or off by hardware via the connected pilot control point of the SIMOCODE. If a fault occurs, SIMOCODE locks the drive. As soon as the fault is remedied and acknowledged, the drive interlock is released and the drive is ready to be switched on again.

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2.2.13 WCMT_MotLean_FbMMS02 OS faceplates and icons

Each control module type (WCMT) of the PCS 7 Water Templates receives only one icon on the OS for the technological core function, including the associated Panel icon if necessary (the latter is missing if the block is deselected or unavailable). The standard APL faceplates of *MotL* are used in *WCMT_MotLean_FbMMS02* without changes.

Note

The used faceplates and icons of WCMT_MotLean_FbMMS02 are described in the corresponding profile. The profiles are part of this application example and you can obtain them from your regional sales partner.

In the chapter entitled 3 WCMT / (WEMT) profiles you will find the description of a profile using an example.

Further information on the standard PCS 7 OS faceplates and OS icons can be found in the function manual Process Control System PCS 7 Advanced Process Library:
https://support.industry.siemens.com/cs/ww/en/view/109750809

2.2.14 WCMT_MotLean_FbMMS02 Panel faceplates/icon

The Panel icons and faceplates form part of the PCS 7 Industry Library and unlike the PCS 7 OS, they are not provided automatically for the Control Module types (WCMTs) of the PCS 7 Water Templates. The user creates the plant-specific images for IPC/panel operation and monitoring separately via TIA Portal V14 SP1 Upd6 or higher.

Note

The used faceplates and icons of WCMT_MotLean_FbMMS02 are described in the corresponding profile. The profiles are part of this application example and you can obtain them from your regional sales partner.

In the chapter entitled 3 WCMT / (WEMT) profiles you will find the description of a profile using an example.

For further information and configuration aids relating to Panel integration, refer to the article: "Integration of Comfort Panels, Operator Panels and S7-300 Package Units in SIMATIC PCS 7 with PCS 7 Industry Library":
https://support.industry.siemens.com/cs/ww/en/view/50708061

or the Industry Library manual for PCS 7:
https://support.industry.siemens.com/cs/ww/en/view/109750809

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2.3 WCMT_MotSpdCon_FbDrv02 Template

The *WCMT_MotSpdCon_FbDrv02* describes the connection between the SINAMICS G120 P/X frequency converter and the automation system with field bus connection (PROFIBUS DP / PROFINET). Send/receive telegrams in the automation system are processed via the driver block *FbDrive* from the APL.

When comparing the templates *WCMT_MotSpdCon_FbDrv02* and *WCMT_MotLean_FbCom* from chapter 1.5, the CFCs only differ in sheet 1, sheet 4 and sheet 5. The blocks and links in sheet 2 and sheet 3 are functionally identical. The specific contents of *WCMT_MotSpdCon_FbDrv02* are explained in detail in this chapter.

The standard hardware catalog in the HW config provides the various device connections for SINAMICS G120 P and SINAMICS G120 X (telegram types 1 and 20) for connecting via PROFIBUS DP or PROFINET for both types of frequency converter. To achieve the best use of default data for the template *WCMT_MotSpdCon_FbDrv02* it is advisable to select only telegram type 20. This telegram type is reserved by default for SINAMICS G120 P/X in the HW catalog of SIMATIC Manager. Telegram type 1 is not further described in connection with the *WCMT_MotSpdCon_FbDrv02* templates.

The following function manuals describe the configuration of PROFIBUS DP / PROFINET communication with a SINAMICS G120 P/X:

SINAMICS G120P:
https://support.industry.siemens.com/cs/ww/en/view/109757195

SINAMICS G120X:
https://support.industry.siemens.com/cs/ww/en/view/109769350

The use of WCMT_MotSpdCon_FbDrv02 for SINAMICS G120 P/X is the same whether communicating via PROFIBUS DP or PROFINET. In hardware terms, these differ for SINAMICS G120 P only in the model CU230P-2 DP or CU230P-2 PN:

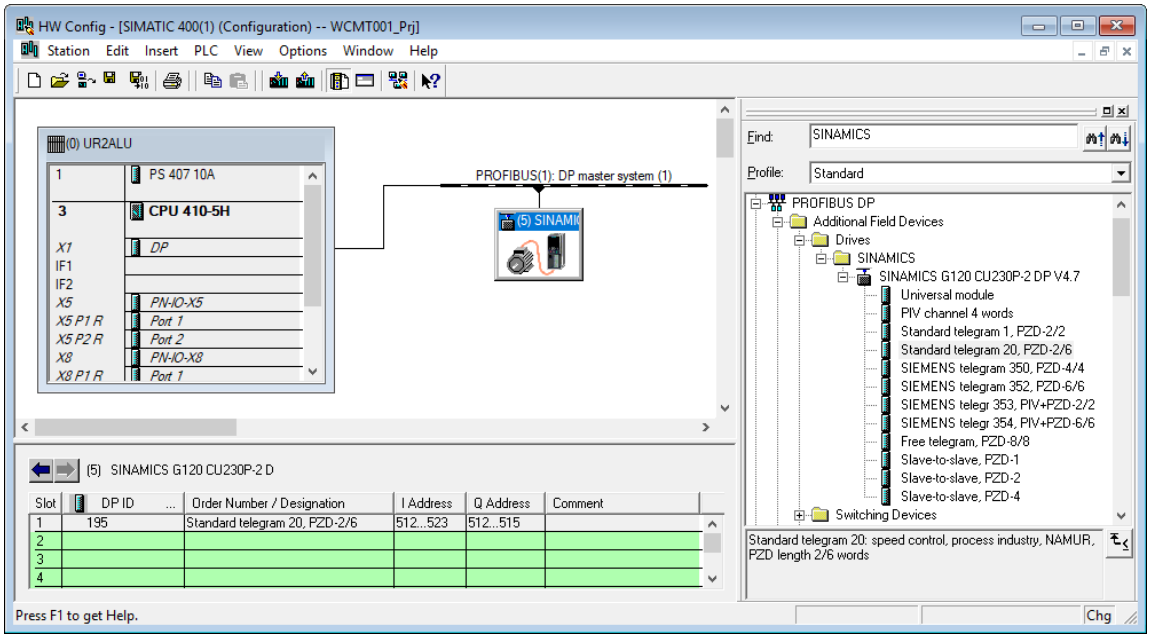
- CU230P-2 DP → PROFIBUS DP
- CU230P-2 PN → PROFINET

and in the case of SINAMICS G120 X, only in its dimensions, which directly impacts the effective electrical power:

- CU type with the size FSA…FSJ
- Order no. (item number)

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Figure 2-35



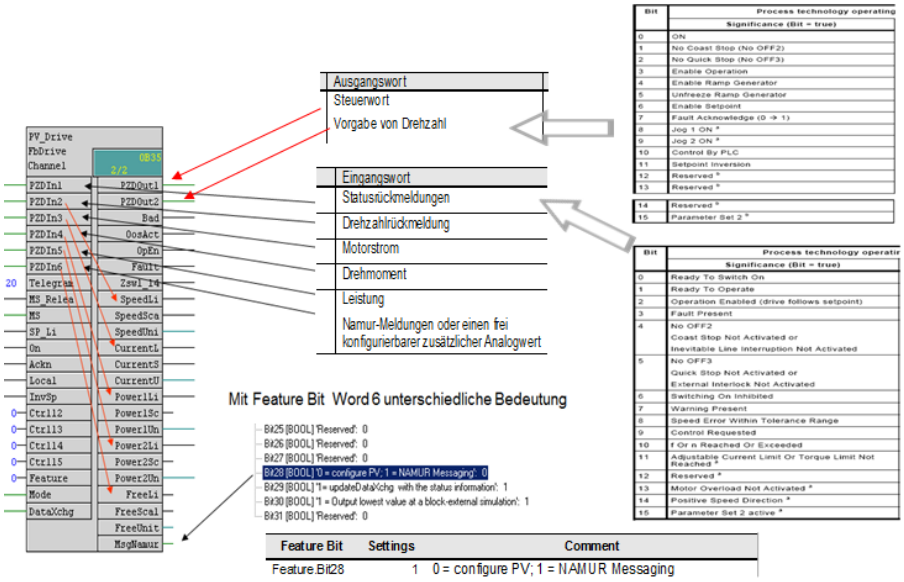
The following figure gives a schematic description of the input/output interfaces of SINAMICS G120 (P) and the channel block *FbDrive*. The telegram type 20 contains 6 input words and 2 output words, which are represented at the channel block *FbDrive* by the inputs "*PZDIn1*" to "*PZDIn6*" and the outputs "*PZDOut1*" and "*PZDOut2*".

Input words:

- Input word *"PZDIn1"* = binary status messages from the frequency converter
- Input word "*PZDIn2*" = analog value for speed from the frequency converter (by default, %)
- Input word "*PZDIn3*" = analog value for motor current from the frequency converter (by default, %)
- Input word "*PZDIn4*" = analog value for torque from the frequency converter (by default, %)
- Input word "*PZDIn5*" = analog value for total active power from the frequency converter (by default, %)
- Input word *"PZDIn6"* = freely selectable analog value/digital input periphery D0...D5 or Namur messages from frequency converter

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Fig. 2-36



By programming Feature Bit 28 at the *FbDrive* driver block, "*PZDIn6*" can be used either for the transmission of Namur messages or for the transmission of an additional freely selectable analog value/digital input values D0...D5. The selection is made via feature bit 28 (signal = 0) on the driver block *FbDrive*. Refer to the table below for Feature Bit settings:

Table 2-7

Feature bit	Settings	Comment
Feature.Bit28	0	*Bit = 0: Messages are freely configurable and read as PV* Bit = 1: Messages are read as MsgNamur
Feature.Bit29	1	Bit = 0: No transmission of information *Bit = 1: Transmission and message to the primary diagnostics block*
Feature.Bit30	1	Bit = 0: If an input parameter has the simulation value 16#60, the value 16#0000 is given out at the output parameter "*PZDOut1*". *Bit = 1: If an input parameter has the simulation value 16#60, the value is written to the field device.*

Italics = default setting

The table shows the arrangement of NAMUR messages in the input word PZDIn6:

Table 2-8

Bit	Signal name	0 signal	1 signal
00	Fault in the frequency converter information electronics/SW error	No	Yes
01	Power system fault	No	Yes
02	DC-link overvoltage	No	Yes
03	Inverter power electronics fault	No	Yes
04	Power inverter temperature rise	No	Yes
05	Ground fault	No	Yes
06	Engine overload	No	Yes

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Bit	Signal name	0 signal	1 signal
07	Bus fault	No	Yes
08	External safety shutdown	No	Yes
09	Error engine encoder	No	Yes
10	Internal communication fault	No	Yes
11	Incoming unit fault	No	Yes
15	Other faults/errors	No	Yes

Note If the additional NAMUR messages in FbDrive (Feature Bit 28 = 1) are used, the messages provided must be retroactively given further interconnections by the user at the conversion block "*MsgNamur*" (W_BO).

The tables show the configuration of a freely selectable analog value, for example of a motor temperature or external wiring of the digital input periphery DI0...DI5, for a hardware-level local control point with input word PZDIn6:

Table 2-9

WORD	Signal name	Measuring range	Unit
PIW	Motor temperature	0.0 … 150.0	°C

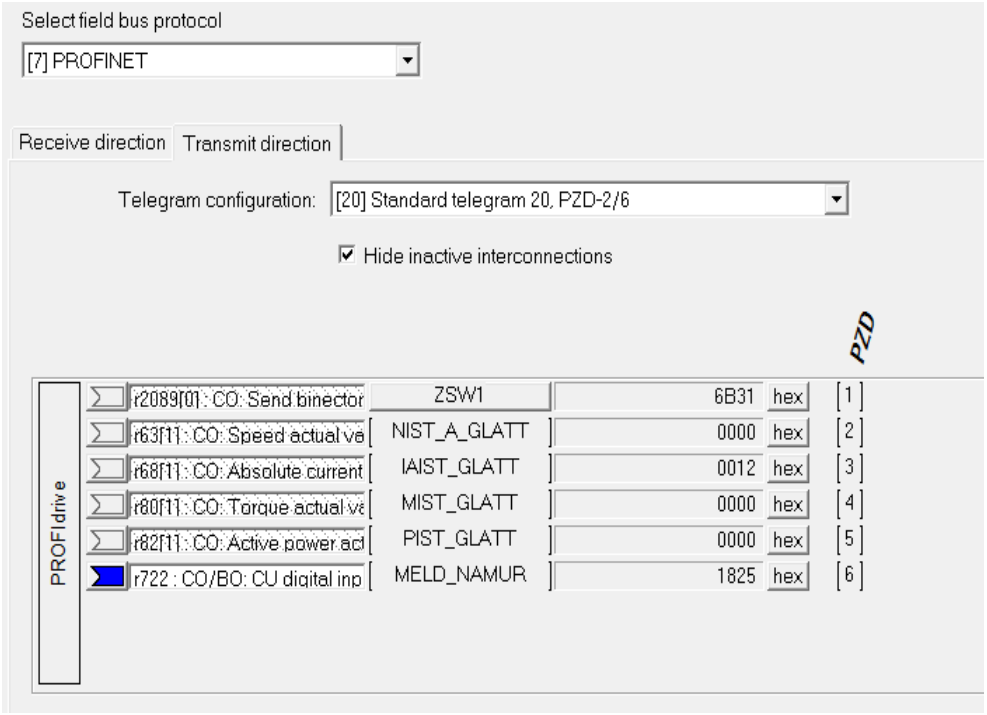
Table 2-10

Bit	Signal name	0 signal	1 signal
0	D0 = repair switch	Off	On
1	D1 = Local HW	Off	On
2	D2 = Remote HW	Off	On
3	D3 = Motor stop button	Bad	Good
4	D4 = Feedback signal (Fwd >)	Off	On
5	D5 = Motor protection tripped or Emergency Stop	Bad	Good
6	Not used	-	-
7	Not used	-	-

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To further manipulate the digital input periphery of the SINAMICS G120 (P) using the STARTER tool or of the SINAMICS G120 X/P using the IOP-2[4] or alternatively via WLAN with the Smart Access Module (optional), program the Index "r722" in the field bus range for telegram 20 /PZE 6.

Figure 2-37



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[4] IOP-2 = Intelligent Operator Panel - 2nd generation

Binary commands are forwarded via the output values "*PZDOut1*" and "*PZDOut2*" and analog setpoint values are forwarded from the automation system to SINAMICS.

Output words:

- Output word "*PZDOut1"* = binary commands to the frequency converter
- Output word "*PZDOut2"* = rotational speed setpoint value specification to the frequency converter

Note

For further information about the configuration of frequency converters, refer to the following links:

Configuration with the APL Channel Block "FbDrive" in SIMATIC PCS 7:
https://support.industry.siemens.com/cs/ww/en/view/64181993

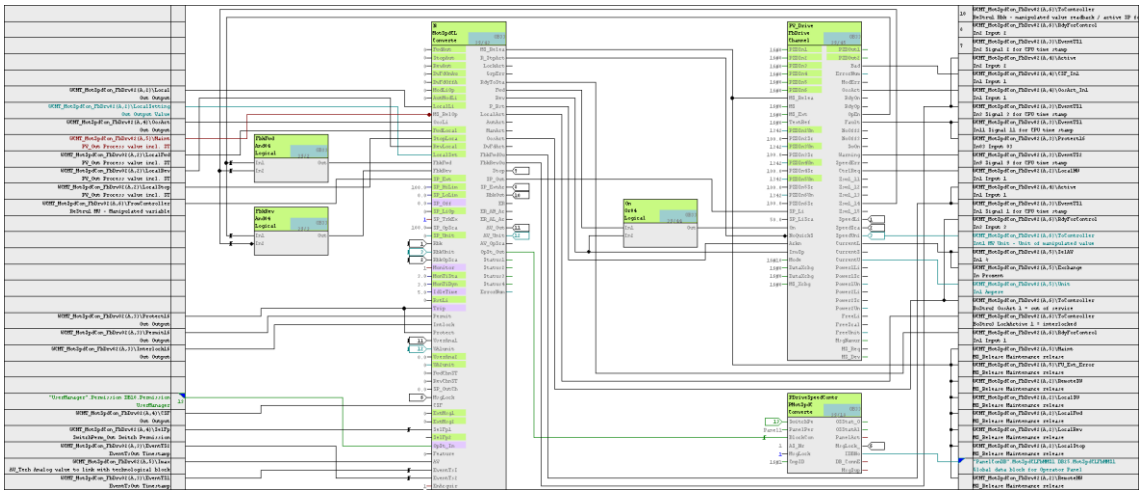
Configuration of SINAMICS / MICROMASTER Drives with Drive ES in SIMATIC PCS 7
https://support.industry.siemens.com/cs/ww/en/view/58007228

Getting Started SINAMICS G120 Control Units CU230P-2; CU240B-2; CU240E-2:
https://support.industry.siemens.com/cs/ww/en/view/94003665

SINAMICS G120 converters with CU240B-2 and CU240E-2 Control Units
https://support.industry.siemens.com/cs/ww/en/view/109757230

2.3.1 CFC subplan A sheet 1

Figure 2-38



In subplan A sheet 1, *WCMT_MotSpdCon_FbDrv02* provides a SINAMICS G120 P/X frequency converter with two directions of rotation via an *FbDrive* APL field bus driver block. Here, the driver block supplies/removes the *MotSpdCL* cyclically via Send and Receive telegrams with SINAMICS G120 P/X

The template *WCMT_MotSpdCon_FbDrv02* differs from *WCMT_MotLean_FbCom* in multiple aspects:

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1. Technological core functions, including field bus connection (PROFIBUS DP/PROFINET)
2. Operating hours counter based on the direction of rotation
3. Frequency converter general fault consisting of
   a. Motor protection
   b. Overtemperature,
   c. Overload

   rather than specific classified faults
4. Conversion of motor current from % to Amperes
5. Pre-configured coupling to WCMT_Aggr08

The *FbDrive* provided in PCS 7 automatically connects to the device type configured in the HW Config during the compiling process. This requires the activation of the compiler option "Generate with block drivers".

Note It is crucial to program the same peripheral number for PIW and PAW (e.g. PIW 512 und PAW 512) when entering addresses in the HW config for automatic interconnection of the peripheral address in the CFC.

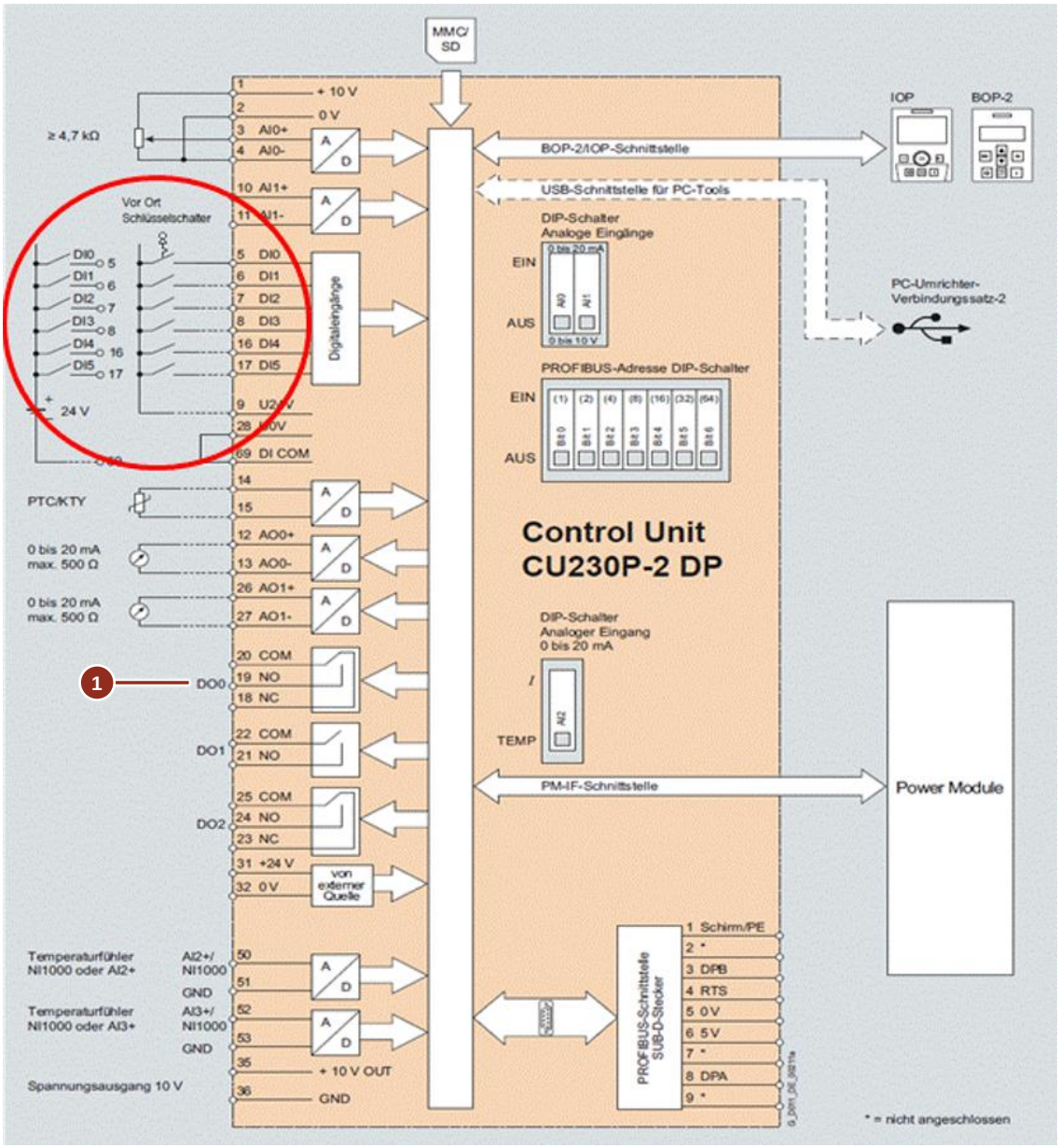
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With telegram type 20, *FbDrive* provides four analog values from the frequency converter via the *FbDrive* outputs. The analog value "RPM feedback" is output via the "*SpeedLi*" output. This is connected directly to the "*Fkb*" input of *MotSpdCL.*

FbDrive relays the motor current to the "*CurrentLi*" output of the *Exchange* block in subplan A sheet 5. Further processing is functionally the same, as described in detail in chapter 2.2.5 CFC subplan A sheet 5.

The torque and active power of the frequency converter are transferred directly from the PCS 7 driver block *FbDrive* via the outputs "*Power1Li*" or "*Power2Li*" to "*UserAna1*" or "*UserAna2*" of *MotSpdCL*. Both values, including units, are provided in the PCS 7 OS, in the standard view of *MotSpdCL*.

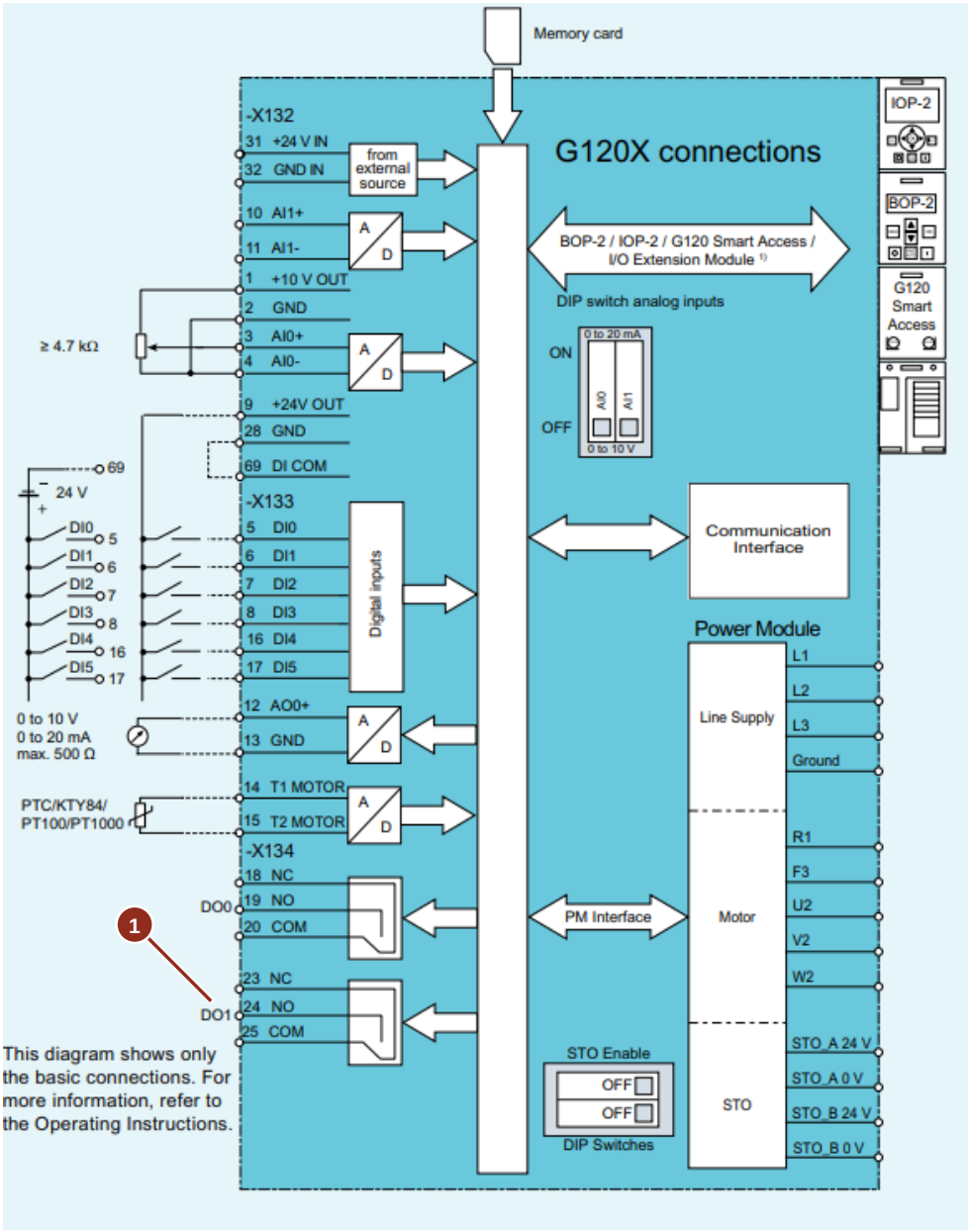
Figure 2-39 Figure for SINAMICS G120 P with PROFIBUS DP



1* Integration of relay contact DO1 "Local Locked" only when using "LocalSW-0-Ps" via PCS 7 control command Ctrl 12 = Bit12 from PZDOut 1.

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Figure 2-40 Figure for SINAMICS G120 X with PROFINET and PROFIBUS



1* Integration of relay contact DO1 "Local Locked" only when using "LocalSW-0-Pos" via PCS 7 control command Ctrl 12 = bit 12 of PZDOut 1.

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Note

You can find additional information on SINAMICS G120 X in the following articles:

Product note: New types of communication! Sales release for SINAMICS G120X - FSA to FSJ
https://support.industry.siemens.com/cs/ww/en/view/109762168

Compact Hardware Installation Instructions
https://support.industry.siemens.com/cs/ww/en/view/109769421

Manual:
https://support.industry.siemens.com/cs/ww/en/view/109769350

GSDL file:
https://support.industry.siemens.com/cs/ww/en/view/109763250

Firmware:
https://support.industry.siemens.com/cs/ww/en/view/109771049

The operator functions for Automatic, Manual and Local Control (Local SW and LocalHW) have the exact same software as those in the CFC in chapters 2.2.1 and 2.2.2.

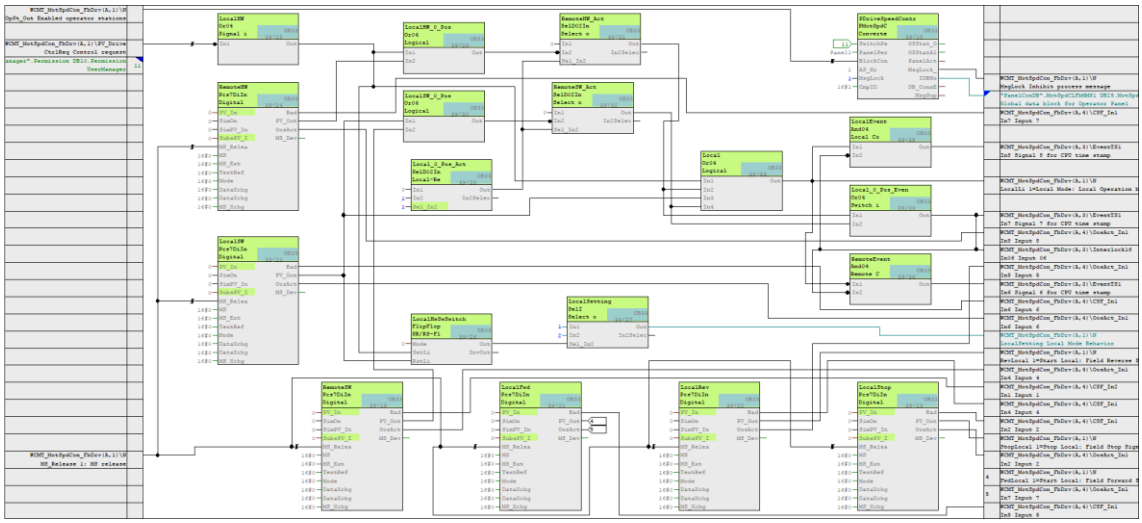
The external local control on the SINAMICS G120 differs from the scheme in chapter 2.1.2 in that the frequency converter, when in "Local SW" mode, provides the buttons START, STOP and Direction of Rotation Right/Left via the control panel (IOP).

In the "Remote SW" mode, the IOP transfers control of the frequency converters to PCS 7. Hardware-level local/remote switching is possible in the "Local HW / Local Remote" mode. The local control point should be wired to the digital input periphery as per the example table 2.10.

2.3.2 CFC subplan A sheet 2

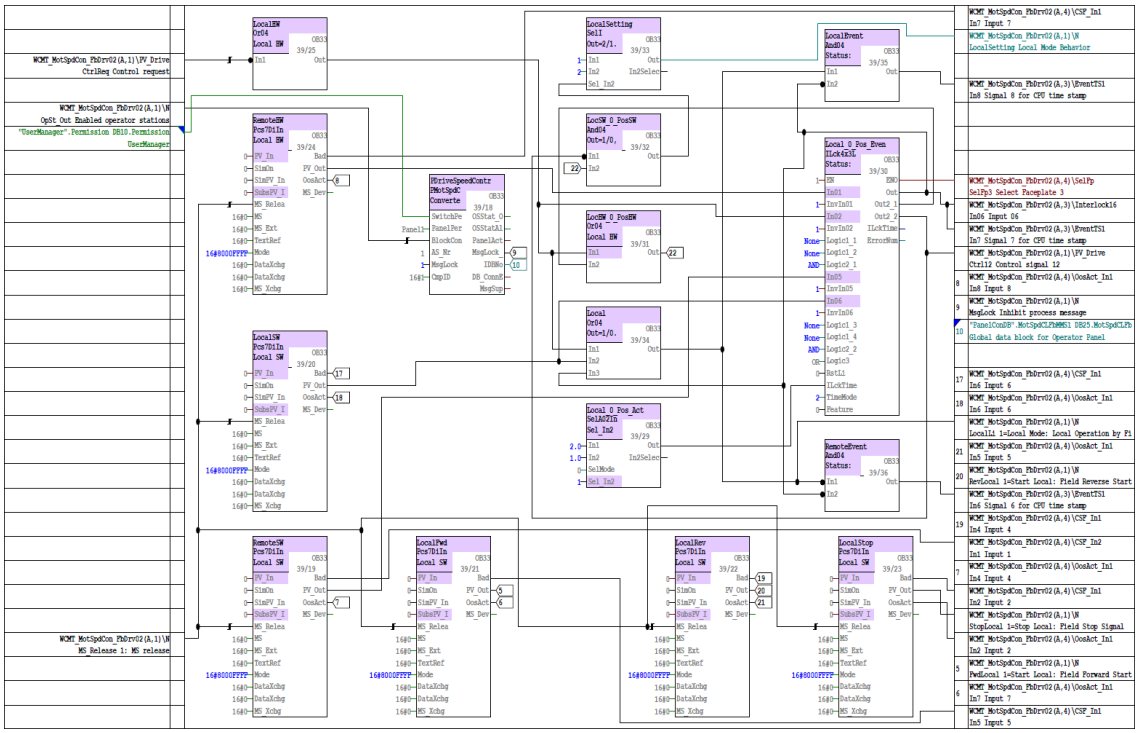
The description matches the description of WCMT_MotLean_FbCom. Further information can be found in chapter: 2.1.2 CFC subplan A/sheet 2

Figure 2-41 First-generation local control stations



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Figure 2-42 Second-generation local control stations



After activation by a key switch, the local on-site operation considers a switchover between on-site, remote and a neutral intermediate position (local - 0 - remote).

With the simultaneous use of both variants of local control (LocalSW + LocalHW), the hardware-based control (LocalHW) has more often priority over the software-based control (LocalSW).

Exceptional case

Independent from the local switch position "LocalHW", if you put the the local on-site operation "LocalSW" switch to the neutral intermediate position "(0-Pos) = drive lock", the drive lock get automatically the higher operator authorization.

WARNING

Important safety warning:

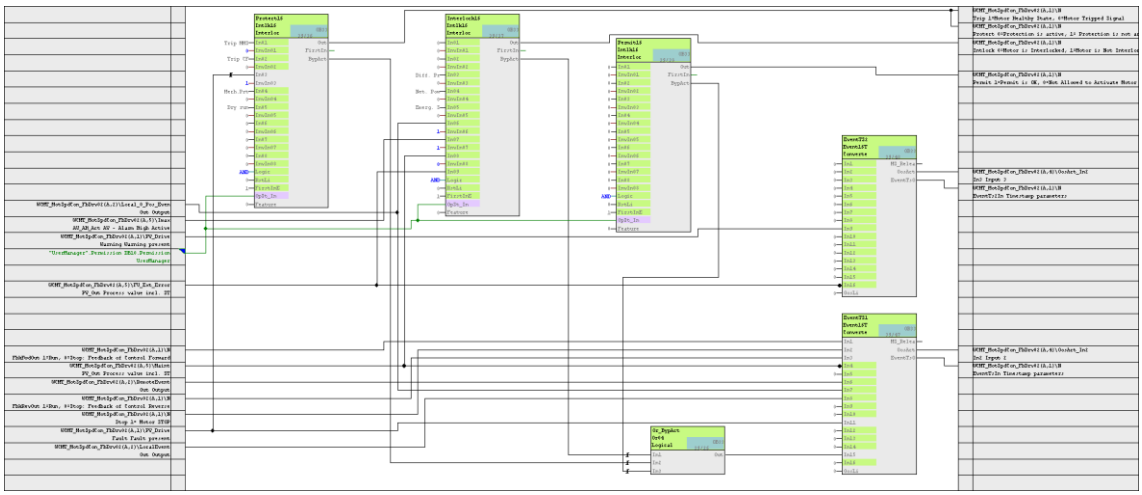
In order for the previously described drive lock "LocalSW = 0-Pos" to be effective in the hardware-based control circuit of the drive, it must be additionally locked via a digital output on the SINAMICS (Local Locked) by a relay contact on the basic unit or alternatively via the extension module output (only G120X). (see examples on page 77 or 78). If this is not taken into account, it is possible to operate the drive via "LocalHW"; with the on/off buttons in the control circuit despite the upcoming LocalSW drive lock.

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2.3.3 CFC subplan A sheet 3

The description corresponds to that of the WCMT_MotLean. Further information can be found in chapter: 2.1.3 CFC subplan A/sheet 3

Figure 2-43

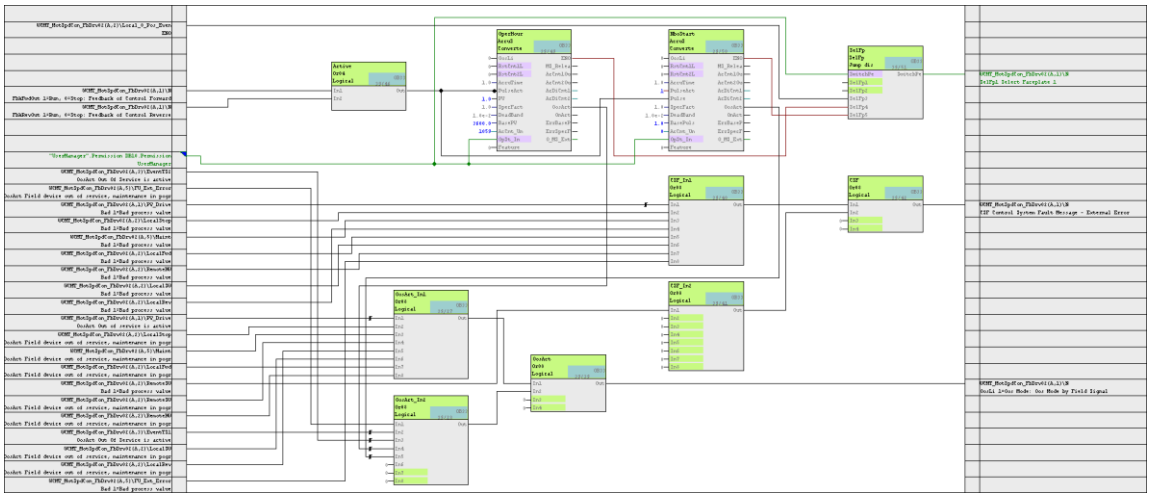


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2.3.4 CFC subplan A sheet 4

The description corresponds to that of the WCMT_MotLean. Further information can be found in chapter: 2.1.4 CFC subplan A/sheet 4

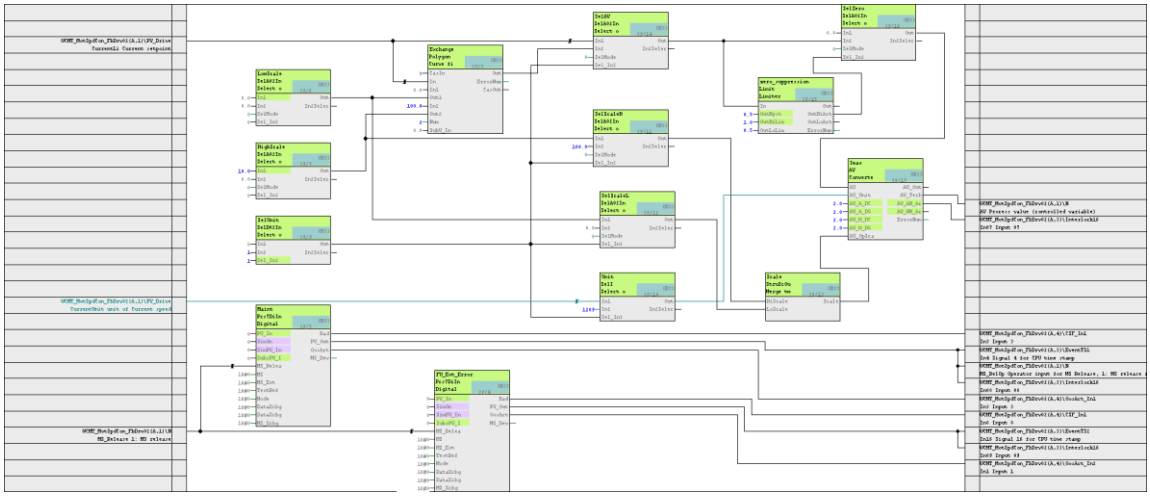
Figure 2-44



2.3.5 CFC subplan A sheet 5

In subplan A sheet 5 of *WCMT_MotSpdCL_FbDrv02,* the interconnected "Motor current" is further processed by the PCS 7 *FbDrive* in the *Exchange* block.

Figure 2-45



A programmable delay time suppresses an alarm message in case of a short-term exceeding of Imax (chatter suppression). If this time is exceeded and the value is still > I_{max}, an alarm message is generated.

An additional zero point suppression can also be activated as an offset (0.0 A). The offset suppresses a measured-value drift < 0.0 A. This function is optional and can be configured according to the plant or removed in the WCMT.

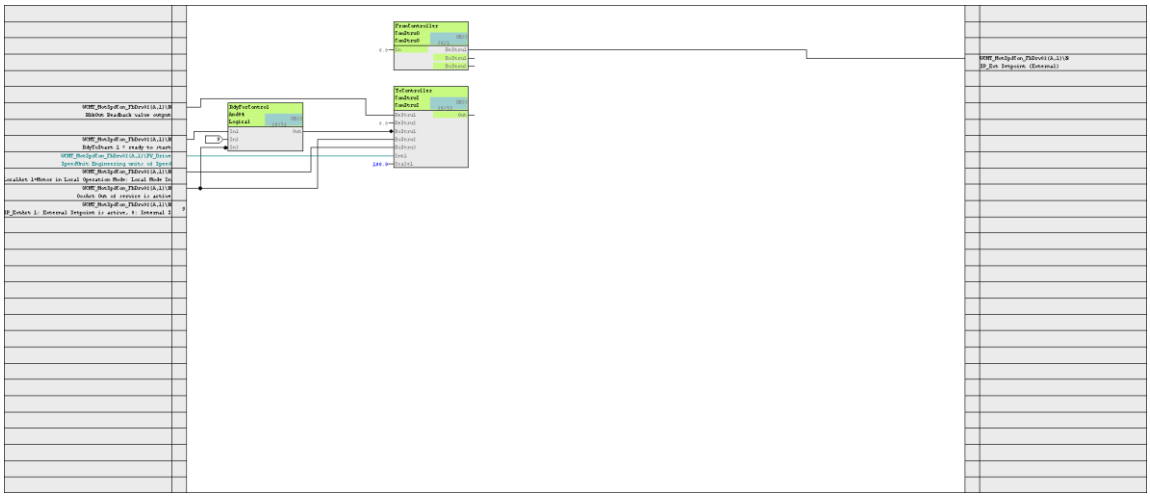
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In the *WCMT_MotSpdCL_FbDrv02* subplan A sheet 1, the motor current is interconnected with *MotSpdCL* via "*AV*". An additional Limit View is provided in *MotSpdCL* on the PCS 7 OS. Measuring range start/finish and four configurable limits are additionally available to enable the user to perform operation and monitoring of the engine current.

2.3.6 CFC subplan A sheet 6

The PCS 7 Water Templates keep the range ready for further communication enhancements in all subplans A sheet 6. This subplan is conceptually ready for local data exchange, serial connections or remote control technology.
For controller and motorized sluice blocks as well as frequency converters, prefabricated switching blocks are provided which can be swiftly and customizably interconnected with one connection (plug and coupling). This pre-packaged variant can be extended at any time to suit the project; it is designed for rapid configuration with WCMT_Aggr08.

Figure 2-46



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2.3.7 WCMT_MotSpdCon_FbDrv02 OS faceplates and icons

Each control module type (WCMT) of the PCS 7 Water Templates receives only one icon on the OS for the technological core function, including the associated Panel icon if necessary (the latter is missing if the block is deselected or unavailable). The standard APL faceplates from *MotSpdC* are used in *WCMT_MotSpdCon_FbDrv02* without changes.

Note

The used faceplates and icons of *WCMT_MotSpdCon_FbDrv02* are described in the corresponding profile. The profiles are part of this application example and you can obtain them from your regional sales partner.

In the chapter entitled 3 WCMT / (WEMT) profiles you will find the description of a profile using an example.

Further information on the standard PCS 7 OS faceplates and OS icons can be found in the function manual Process Control System PCS 7 Advanced Process Library:
https://support.industry.siemens.com/cs/ww/en/view/109750809

2.3.8 WCMT_MotSpdCon_FbDrv02 Panel faceplates/icons

The panel icons and faceplates form part of the PCS 7 Industry Library and unlike the PCS 7 OS, they are not provided automatically for the Control Module Types (WCMTs) of the PCS 7 Water templates. The user creates the plant-specific images for Panel/IPC operation and monitoring separately via TIA Portal V14 SP1 Upd6.

Note

The used faceplates and icons of *WCMT_MotSpdCon_FbDrv02* are described in the corresponding profile. The profiles are part of this application example and you can obtain them from your regional sales partner.

In the chapter entitled 3 WCMT / (WEMT) profiles you will find the description of a profile using an example.

For further information and configuration aids relating to Panel integration, refer to the article: "Integration of Comfort Panels, Operator Panels and S7-300 Package Units in SIMATIC PCS 7 with PCS 7 Industry Library":
https://support.industry.siemens.com/cs/ww/en/view/50708061

or the Industry Library manual for PCS 7:
https://support.industry.siemens.com/cs/ww/en/view/109750809

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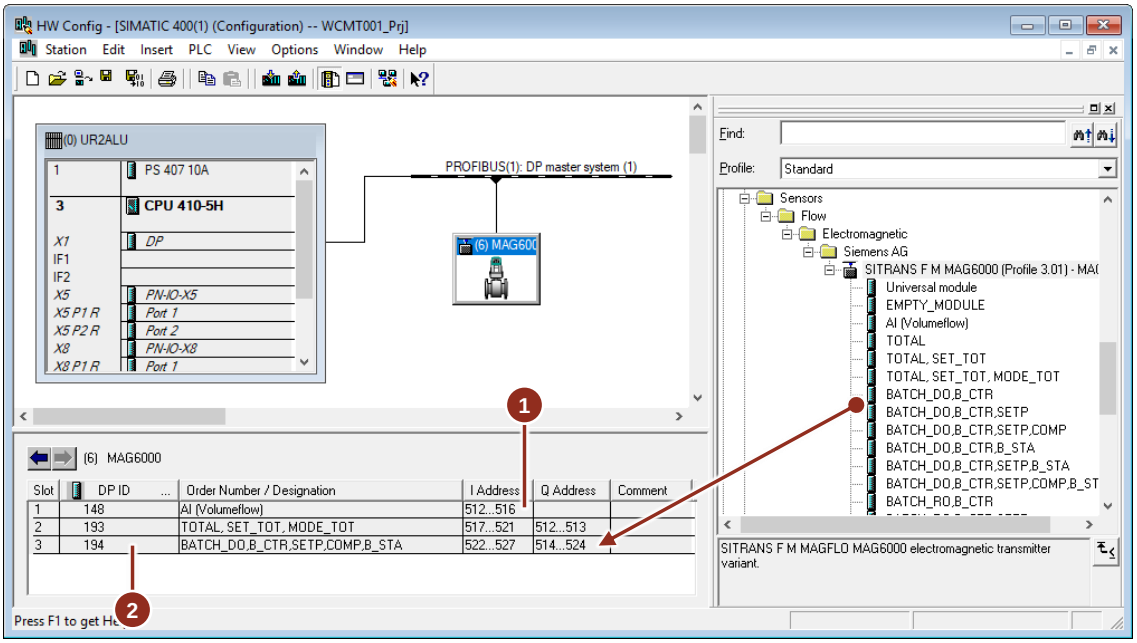
2.4 WCMT_SitrMAG6000_Fb Template

The PCS 7 Water Template *WCMT_SitrMAG6000_Fb* provides descriptions of a flow transmitter, type SITRANS MAG 6000 with field bus connection. Measuring transducers are connected with the automation system (AS) via PROFIBUS DP. The Data supply / deletion is carried out in the automation system by means of an APL-conformant block *FbMag6T* from the SITRANS Library.
When compared to the above-described basic concept of *WCMT_MotLean_FbMMS02*, the *WCMT_SitrMAG6000_Fb* differs in some points in the subplan A sheet 1..4.

The following figure shows the standard hardware catalog in the HW config. The path shown identifies the device selection for connecting the MAG6000 via PROFIBUS DP to the AS

Cyclic data is configured in the HW config. These determine simultaneously the type of CFC function block and associated faceplate.

Figure 2-47



(1) Address for addressing in the CFC

(2) Configuration of cyclic data (flow, counter 1, dosing, counter 2)

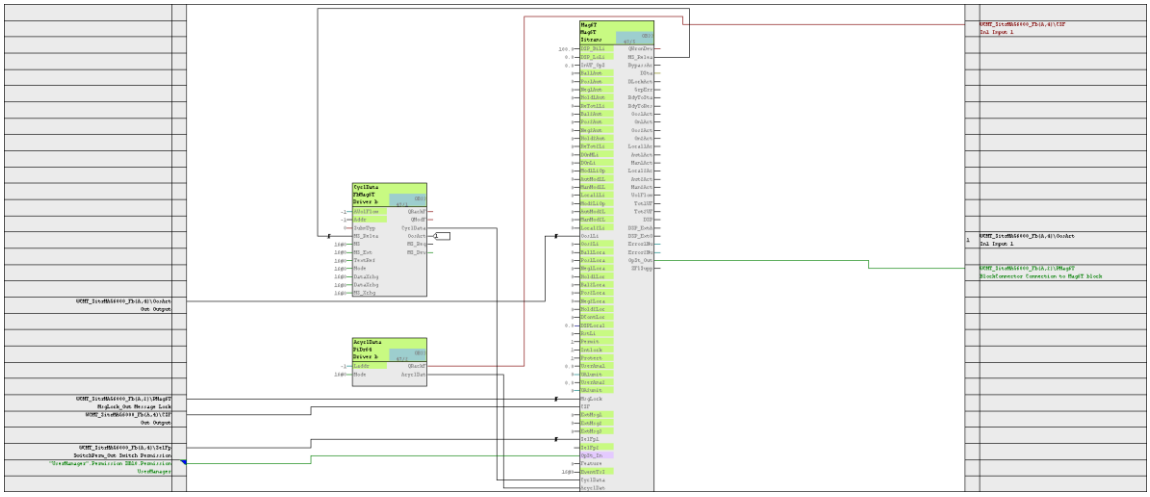
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2.4.1 CFC subplan A sheet 1

The *FbMag6T* SITRANS Library unites the driver block and analog monitoring into one block. The assignment of Feature Bit parameters enables the user to select the desired function, e.g. flow rate with two independent counters or flow with a single counter and a single dosing.
The interconnection of the blocks has been prepared as an example in the template *WCMT_SitrMAG6000_Fb.* In the project, the user only specifies the functions depending on the specific task. Once a PCS 7 OS compilation is carried out at a later stage, the faceplates will be available, ready for operator control and monitoring, depending on the above mentioned function selection. Cyclic and acyclic data is transmitted in the *WCMT_SitrMAG6000_Fb* template between the MAG6000 flowmeter and the automation system via PROFIBUS DP. APL compliant representations of *FbMag6T* are also available:

1. Operating modes
   - in progress/out of service
   - Automatic/Manual
2. APL or IL based multi-user concept (with Panel connection, if required)
3. Startup characteristics after system start, e.g.
   - Exit active dosing: Yes/No
   - Re-read configuration data (e.g. units, limit values): Yes/No
4. Resetting of interlocks
5. Message suppression

Figure 2-48



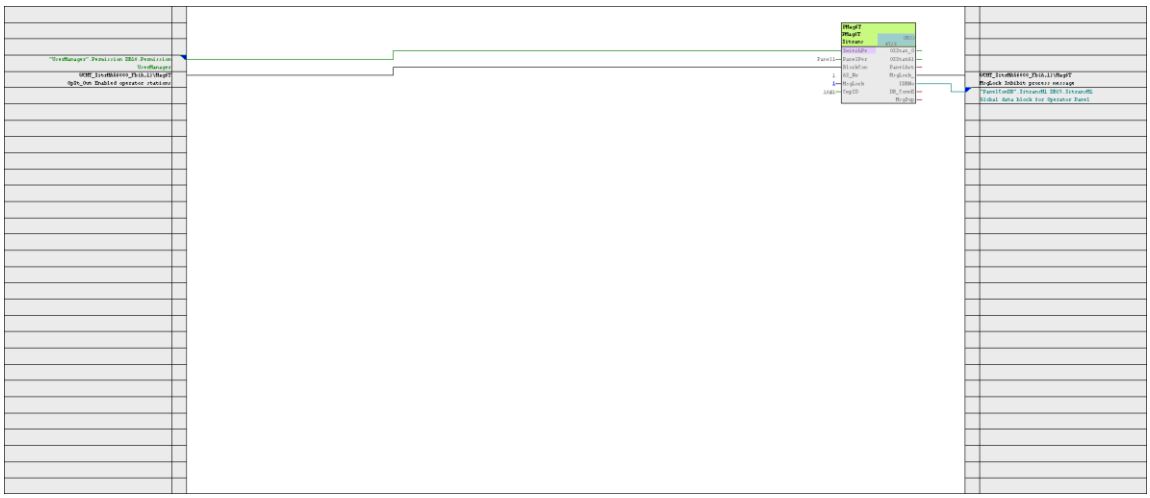
Note Additional information is available in the SITRANS Library manual at the following link
https://support.industry.siemens.com/cs/ww/en/view/109769432

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2.4.2 CFC subplan A sheet 2

The following subplan A sheet 2 provides you with the additional panel control for local on-site monitoring with software-level connection.

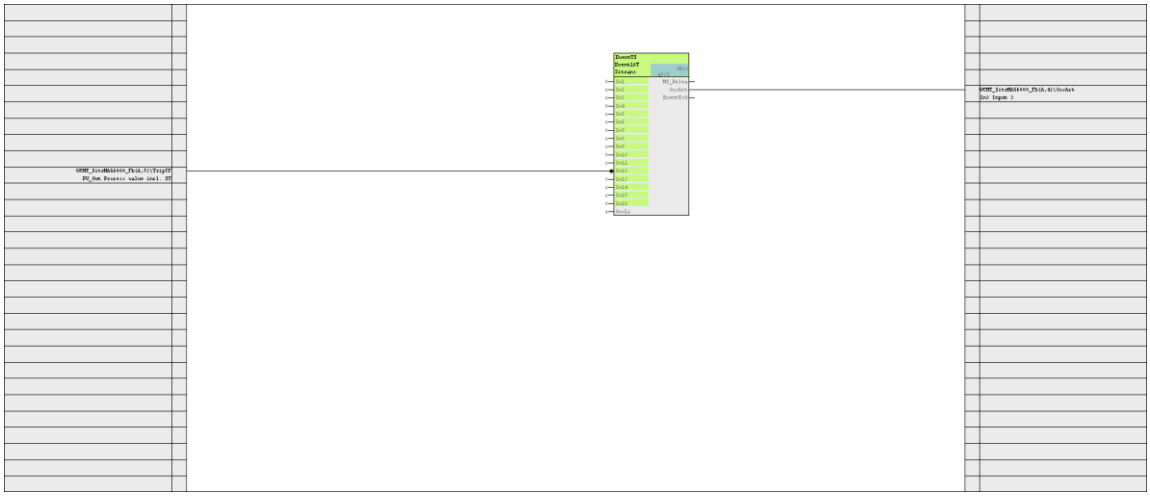
Figure 2-49



2.4.3 CFC subplan A sheet 3

The newly implemented messaging behavior is realized in the following subplan A sheet 3 with an EventTS block. The EventTS blocks receive the operating and fault messages from the input drivers for sensor monitoring in sheet 5.

Figure 2-50

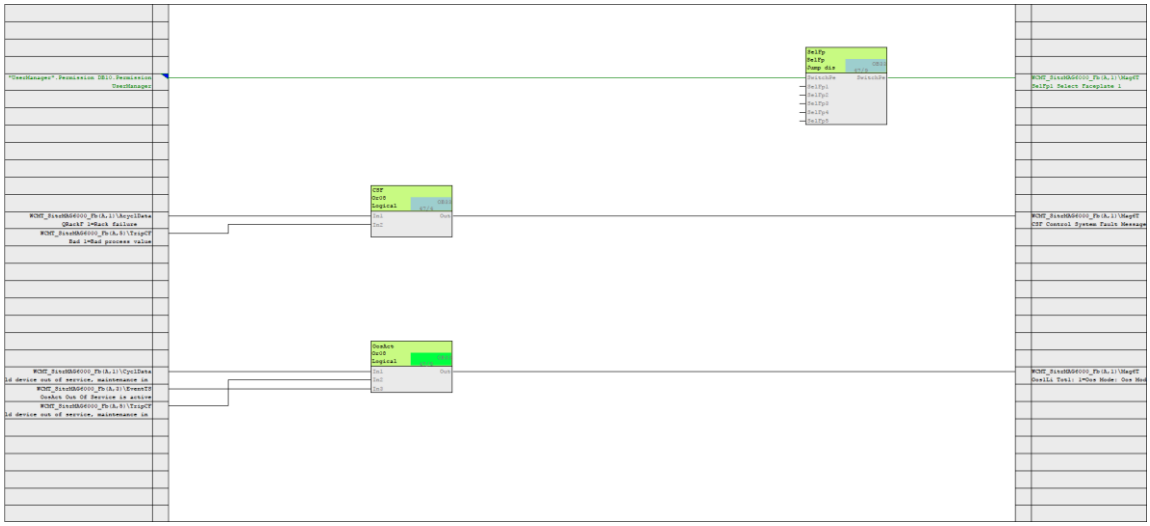


2.4.4 CFC subplan A sheet 4

The jump distributor *SelFp* is identical to the solution from WCMT_MotLean_FbCom. Further information can be found in chapter: 2.1.4 CFC subplan A/sheet 4

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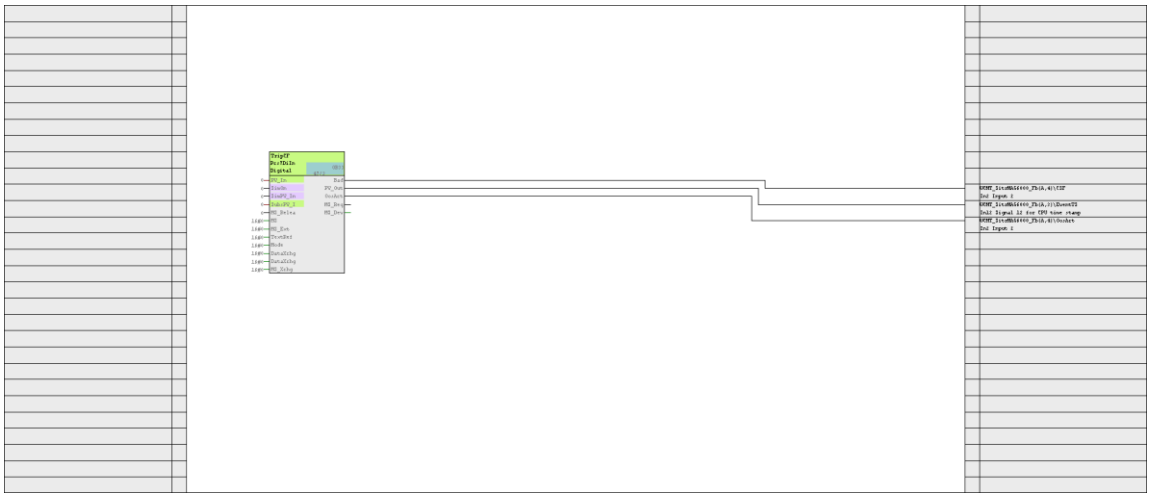
Figure 2-51



2.4.5 CFC subplan A sheet 5

Sensor monitoring has been realized in subplan sheet 5 below.

Figure 2-52



2.4.6 CFC subplan A sheet 6

The CFC chart sheet 6 is available to the user as a reserve.

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2.4.7 WCMT_SitrMAG6000_Fb OS faceplates and icons

Each control module type (WCMT) of the PCS 7 Water Templates receives only one icon on the OS for the technological core function, including the associated Panel icon if necessary (the latter is missing if the block is deselected or unavailable). The standard APL faceplates of *SitrMAG6000* are used in *WCMT_SitrMAG6000_Fb* without changes.

Note

The used faceplates and icons of WCMT_SitrMAG6000_Fb are described in the corresponding profile. The profiles are part of this application example and you can obtain them from your regional sales partner.

In the chapter entitled 3 WCMT / (WEMT) profiles you will find the description of a profile using an example.

Further information on the standard PCS 7 OS faceplates and OS icons can be found in the function manual Process Control System PCS 7 Advanced Process Library:
https://support.industry.siemens.com/cs/ww/en/view/109750809

2.4.8 WCMT_SitrMAG6000_Fb panel faceplates/icons

The panel icons and faceplates form part of the PCS 7 Industry Library and unlike the PCS 7 OS, they are not provided automatically for the Control Module Types (WCMTs) of the PCS 7 Water templates. The user creates the plant-specific images for Panel/IPC operation and monitoring separately via TIA Portal V14 SP1 Upd6.

Note

The used faceplates and icons of WCMT_SitrMAG6000_Fb are described in the corresponding profile. The profiles are part of this application example and you can obtain them from your regional sales partner.

In the chapter entitled 3 WCMT / (WEMT) profiles you will find the description of a profile using an example.

For further information and configuration aids relating to Panel integration, refer to the article: "Integration of Operator Panels in SIMATIC PCS 7 with the Industry Library"
https://support.industry.siemens.com/cs/ww/en/view/50708061

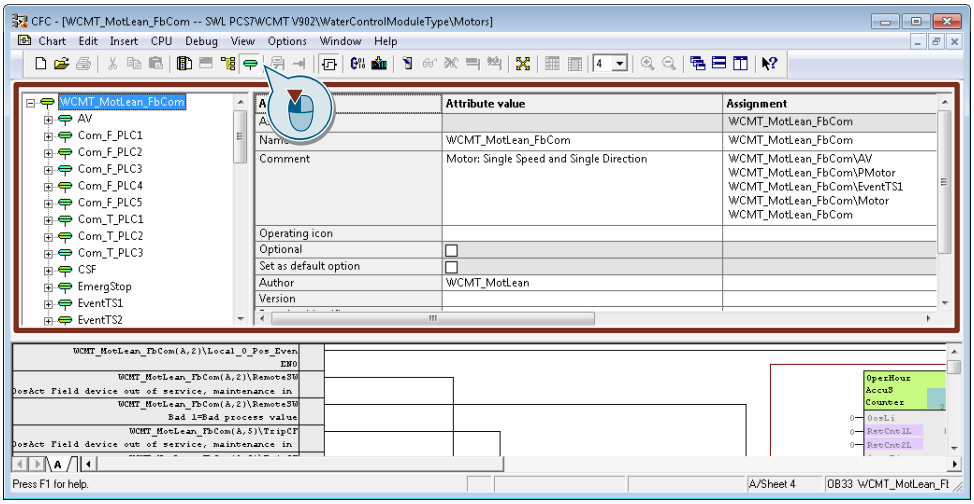
or the Industry Library manual for PCS 7:
https://support.industry.siemens.com/cs/ww/en/view/109750809

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2.5 WCMT use with PCS 7/PCS 7 Plant Automation Accelerator/COMOS

The Water Control Module Types (WCMTs) are suitable for use with PCS 7, PCS 7 Plant Automation Accelerator or COMOS. The optional connection and disconnection of the variants in the respective instanced WCMTs is made via the technological connections. At the same time, data exchange and the matching of data with the PCS 7 Plant Automation Accelerator or COMOS takes place via this interface.

Figure 2-53



In the corresponding WCMT profiles you will find tables describing which blocks are used in the WCMT and which blocks are optional.

2.5.1 New WCMT features in PCS 7 V9.0 SP2

Tag extension in the technological I/O editor

With the new CMT functionalities in PCS 7 V9.0 SP2, engineers have access to efficient and time-saving aids. To make the most use of these in the new WCMTs, all PCS 7 WCMT input/output tags with characteristics relevant to configuration (parameters, signals, limit values, etc.) have been carried over into the technological I/O editor. Thanks to this feature, these parameters can be imported into the PCS 7 project from a project EXCEL list via the Plant Automation Accelerator (PAA).

Support for type-instance behavior

This new CMT function, too, has been introduced with PCS 7 V9.0 SP2. In the function, it is activated by default with a check mark under "Support type-instance behavior" and ensures data synchronization between the WCMT in the master data library and the instance in the project.

If the check mark is removed in the corresponding instance, this instance will no longer be compared against the WCMT from the master data library and thereby loses the continuous synchronization from an imported EXCEL list in PAA/COMOS.

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This instance has the status of a process tag type. The input/output tags will behave exactly like I/Os marked in gray.

Note

Further information can be found in the following articles:

Control Module (CM) Technology - Efficient Engineering in SIMATIC PCS 7
https://support.industry.siemens.com/cs/ww/en/view/109475748

Engineering efficiency in the interaction of SIMATIC PCS 7 Plant Automation Accelerator, SIMATIC PCS 7 and SIMIT Simulation
https://support.industry.siemens.com/cs/ww/en/view/109770538

SIMATIC PCS 7 Plant Automation Accelerator (PAA) using a practical example:
https://support.industry.siemens.com/cs/ww/en/view/109742154

How do you import signals, parameters, Control Modules and Hardware into the Plant Automation Accelerator (PAA) with Excel Import?
https://support.industry.siemens.com/cs/ww/en/view/109761468

2.5.2 Using the PCS 7 Plant Automation Accelerator/COMOS

For further information about use with PCS 7 Automation Accelerator (PAA/COMOS), please refer to the manuals for the PCS 7 Plant Automation Accelerator/COMOS planning tools.

You can also find application examples and further articles on the respective overview pages for PCS 7 Plant Automation Accelerator and/or COMOS.

COMOS overview page:
https://support.industry.siemens.com/cs/document/109739837/comos-overview?dti=0&lc=en-WW

PAA overview page:
https://mall.industry.siemens.com/mall/en/WW/Catalog/Products/10326822#

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3 WCMT / (WEMT) profiles

Note The WCMT profiles were created with PCS 7 V9.0 SP1 and are also valid for PCS 7 V9.0 SP2.

WCMT and WEMT profiles perform a variety of functions and tasks in the description of the PCS 7 Water Templates. The profiles contain the following information on the associated WCMT and WEMT, which are structured in the following sections:

1. Functional description
   (Function, Variants, Statuses, Command types, …)
2. Design specification
   (parameters, inputs, outputs, messages, ...)
3. CFCs
4. Circuit Diagrams

You can use the profiles for various applications such as invitations to tender, specification sheets, requirements sheets, system documentation or for commissioning.

You will find all profiles for the individual control module types in the Zip archive "Water_Templates_PCS7_Steckbriefe_V902_en.zip". The profiles are available in "PDF" file format. Your regional Siemens sales partner will provide you with the profiles at no charge.

https://w3.siemens.com/aspa_app/?lang=en

In the following, the profiles are explained using the example of "WCMT_MotLean_FbMMS_V901".

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3.1 Functional description

Chapter 1 of the profile, "FUNCTIONAL DESCRIPTION", describes the following topics in the respective sub-chapters:

1 FUNCTIONAL SPECIFICATION
- 1.1 INTRODUCTION
- 1.2 VARIANTS LIST
- 1.3 STATES
- 1.4 MODES
- 1.5 EXCEPTION HANDLING
  - 1.5.1 Fault handling
  - 1.5.2 Restart after fault
- 1.6 START-UP BEHAVIOUR
- 1.7 MISCELLANEOUS

3.1.1 Introduction

The introduction contains a short description of how to use the WCMT.

Figure 3-1: "WCMT_MotLean_FbMMS02" profile - Chapter 1.1 Introduction

1.1 INTRODUCTION

WCMT_MotLean is used for the control of motors with one control signal.

1.2 VARIANTS LIST

3.1.2 Variants list

Variant formation is no longer applicable with PCS 7 V9.0 SP2. There is only one variant which describes the high-end expansion. You can still assemble variants yourself according to the PCS 7 CMT technology.

Figure 3-2

1.2 VARIANTS LIST

This chapter describes input and output parameters, interfaces to other modules, statuses and commands.

• WCMT_MotLean_FbCom

With all blocks.

Table 1.2.1 Variants list

Signal / CMT variant				
Block/ Name	**Description**	**Data type**	**Input / Output**	WCMT_MotLean_FbCom
EmergStop				
PV_In	Input value	BOOL	IN	X
ExtReset				
PV_In	Input value	BOOL	IN	X
FbkRun				
PV_In	Input value	BOOL	IN	X
LocalHW				
PV_In	Input value	BOOL	IN	X
LocalSW				
PV_In	Input value	BOOL	IN	X
LocalStart				
PV_In	Input value	BOOL	IN	X
LocalStop				
PV_In	Input value	BOOL	IN	X
Maint				
PV_In	Input value	BOOL	IN	X
Mech_Prot_AH				
PV_In	Input value	BOOL	IN	X
MotorCurrent				
PV_In	Input value	REAL	IN	X

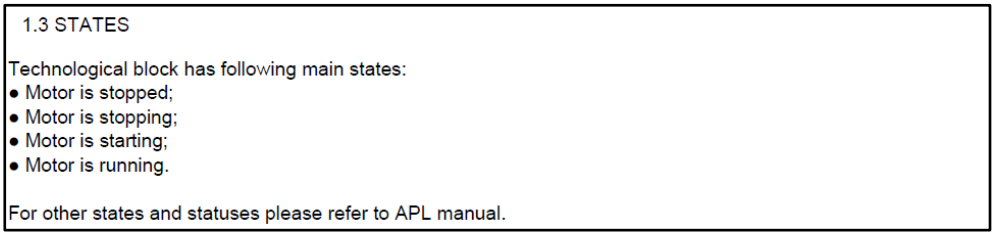
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Note The variants of S7_WCMT were stored in COMOS/PAA and generated automatically during instantiation in PCS 7. To configure the WCMT variants without COMOS/PAA in PCS 7, you must activate/deactivate all optional connections of the desired variant in the technology connections for each instance. Use the configuration table from the profiles to do this. In addition, you can create your own project-related variants from the WCMT by activating or deactivating further options.

3.1.3 States

This chapter describes the principal states of the technology block.

Figure 3-3


1.3 STATES
Technological block has following main states:
• Motor is stopped;
• Motor is stopping;
• Motor is starting;
• Motor is running.
For other states and statuses please refer to APL manual.

Further information regarding the states of the technology blocks can be found in the manual "SIMATIC Process Control System PCS 7 Advanced Process Library (V9.0 SP2)":

https://support.industry.siemens.com/cs/ww/en/view/109760968

3.1.4 Command modes

This chapter describes the operating modes of the WCMT.

Figure 3-4

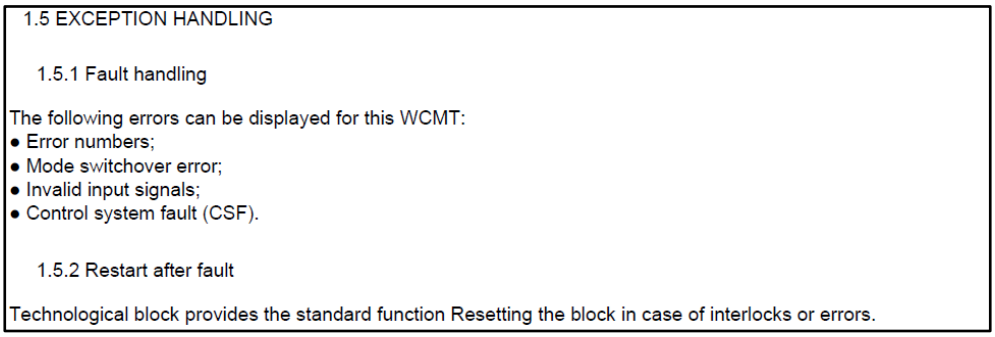


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3.1.5 Exceptional situations

This chapter deals with states in the event of an error. You may refer to the subchapters "Error behavior" and "Restart after error".

Figure 3-5



1.5 EXCEPTION HANDLING

1.5.1 Fault handling

The following errors can be displayed for this WCMT:
- Error numbers;
- Mode switchover error;
- Invalid input signals;
- Control system fault (CSF).

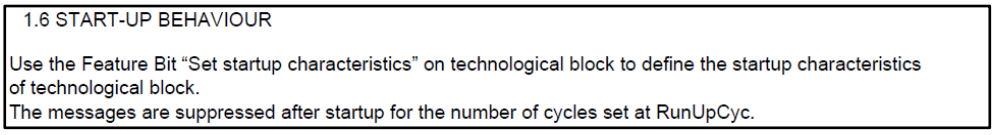
1.5.2 Restart after fault

Technological block provides the standard function Resetting the block in case of interlocks or errors.

3.1.6 Startup characteristics

This section contains information on the startup behavior of the technology block.

Figure 3-6



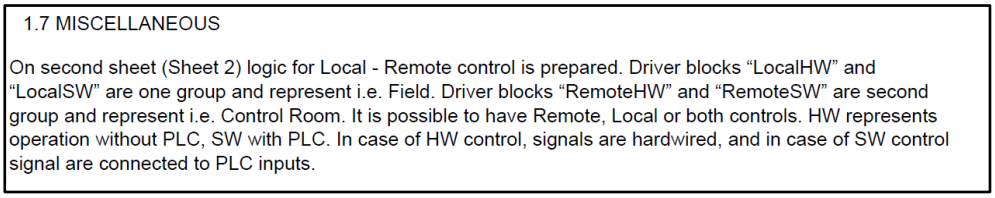
1.6 START-UP BEHAVIOUR

Use the Feature Bit “Set startup characteristics” on technological block to define the startup characteristics of technological block.
The messages are suppressed after startup for the number of cycles set at RunUpCyc.

3.1.7 Interlock

The section "Miscellaneous" contains information on which process values and process signals are connected via digital or analog driver blocks, as well as an overview of the interlocks (with and without acknowledgement) for the PROTECT and INTERLOCK blocks.

Figure 3-7



1.7 MISCELLANEOUS

On second sheet (Sheet 2) logic for Local - Remote control is prepared. Driver blocks “LocalHW” and “LocalSW” are one group and represent i.e. Field. Driver blocks “RemoteHW” and “RemoteSW” are second group and represent i.e. Control Room. It is possible to have Remote, Local or both controls. HW represents operation without PLC, SW with PLC. In case of HW control, signals are hardwired, and in case of SW control signal are connected to PLC inputs.

Note The interlocks connected to the "PROTECT" and "INTERLOCK" blocks are exemplary and can be adapted project-specifically in the master data library of the WCMT.

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3.2 Design specification

In the section "Design Specification" of the profile all parameters, inputs, outputs, interfaces and messages of the single control module type are listed. The presentation is in tabular form. The chapter is divided into the following sub-chapters:

Figure 3-8

2 DESIGN SPECIFICATION
2.1 PARAMETERS
2.2 INPUTS
2.3 OUTPUTS
2.4 INTERFACES TO OTHER MODULES
2.4.1 Status
2.4.2 Commands
2.5 MESSAGES
2.6 VISUALISATION
2.6.1 Block icons
2.6.2 Block icon states
2.6.3 Faceplates

3.2.1 Parameters

Any existing parameters are listed in this section.

Figure 3-9

2.1 PARAMETERS
<<None>>

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3.2.2 Inputs

All input connections of the WCMT and their assignment to the individual variants are described in this section.

Figure 3-10

2.2 INPUTS

Table 2.2.1 Inputs

Parameter / CMT variant				
Block/ Name	**Description**	**Data type**	**Default value**	WCMT_MoEasn_FbCom
AV				
AV	Analog value	REAL	0.0	X
AV_A_DC	AV Alarm Delay Time Coming [s]	REAL	2.0	X
AV_A_DG	AV Alarm Delay Time Going [s]	REAL	2.0	X
AV_Unit	Engineering units of AV	INT	1001	X
AV_W_DC	AV Warning Delay Time Coming [s]	REAL	2.0	X
AV_W_DG	AV Warning Delay Time Going [s]	REAL	2.0	X
CSF				
CSF_In3_In4	Input 4	BOOL	false	X
CSF_In3_In5	Input 5	BOOL	false	X
CSF_In3_In6	Input 6	BOOL	false	X
CSF_In3_In7	Input 7	BOOL	false	X
CSF_In3_In8	Input 8	BOOL	false	X
Com_F_PLC1				
From_PLC_1_6		STRUCT		X
Com_F_PLC2				
From_PLC_7_12		STRUCT		X
Com_F_PLC3				
From_PLC_13_18		STRUCT		X
Com_F_PLC4				
From_PLC_19_24		STRUCT		X
Com_F_PLC5				
From_PLC_25-30		STRUCT		X
Com_T_PLC1				
BoStru1	Control Output to Start	BOOL		X
BoStru2	Reserve	BOOL	false	X
BoStru3	Reserve	BOOL	false	X
BoStru4	Reserve	BOOL	false	X

Note The WCMT variants were stored in COMOS/PAA and automatically generated during instantiation in PCS 7. To configure the WCMT variants without COMOS/PAA in PCS 7, you must activate/deactivate all optional connections of the desired variant in the technology connections for each instance. Use the configuration table from the profiles to do this. In addition, you can create your own project-related variants from the WCMT by activating or deactivating further options.

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3.2.3 Outputs

If there are output connections on the WCMT, these and their assignment to the individual variants are described in this chapter.

Figure 3-11

2.3 OUTPUTS

Table 2.3.1 Outputs

Parameter / CMT variant					WCMT_MotLean_FbCom
Block/ Name		**Description**	**Data type**	**Default value**	
AV					
	AV_AH_Act	AV - Alarm High Active	BOOL		X
	AV_WH_Act	AV - Warning High Active	BOOL		X
Com_F_PLC1					
	BoStru1	Feedback Forward	BOOL		X
	BoStru2	Feedback Reverse	BOOL		X
	BoStru3	Reserve	BOOL		X
	BoStru4	Reserve	BOOL		X
	BoStru5	Reset	BOOL		X
	BoStru6	Maintenance	BOOL		X
Com_F_PLC2					
	BoStru1	Local Forward	BOOL		X
	BoStru2	Local Stop	BOOL		X
	BoStru3	Local Reverse	BOOL		X
	BoStru4	Remote HW	BOOL		X
	BoStru5	Local HW	BOOL		X
	BoStru6	Remote SW	BOOL		X
Com_F_PLC3					

3.2.4 Interface to other modules

Any existing interfaces are listed in this chapter.

Figure 3-12

2.4 INTERFACES TO OTHER MODULES

WCMT_MotLean does not have interface to other blocks (WCMTs).

2.4.1 Status

<<None>>

2.4.2 Commands

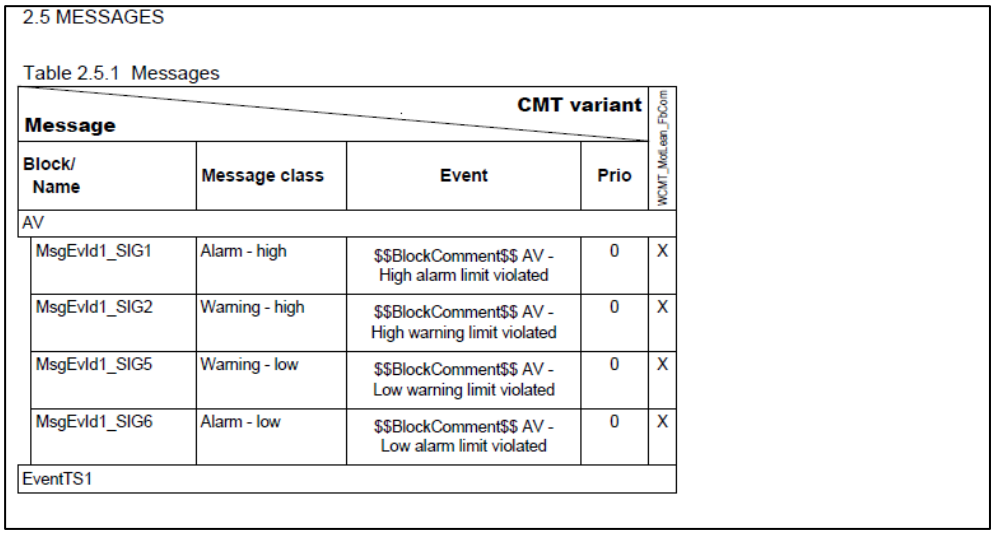
<<None>>

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3.2.5 Messages

This section has a tabular list of all operating and fault messages that can be triggered from the WCMT messaging blocks (depending on the variant selected).

Figure 3-13



2.5 MESSAGES

Table 2.5.1 Messages

Message / CMT variant	Message class	Event	Prio	WCMT_Mot.ean_Fb.com
Block/ Name				
AV				
MsgEvId1_SIG1	Alarm - high	$$BlockComment$$ AV - High alarm limit violated	0	X
MsgEvId1_SIG2	Warning - high	$$BlockComment$$ AV - High warning limit violated	0	X
MsgEvId1_SIG5	Warning - low	$$BlockComment$$ AV - Low warning limit violated	0	X
MsgEvId1_SIG6	Alarm - low	$$BlockComment$$ AV - Low alarm limit violated	0	X
EventTS1				

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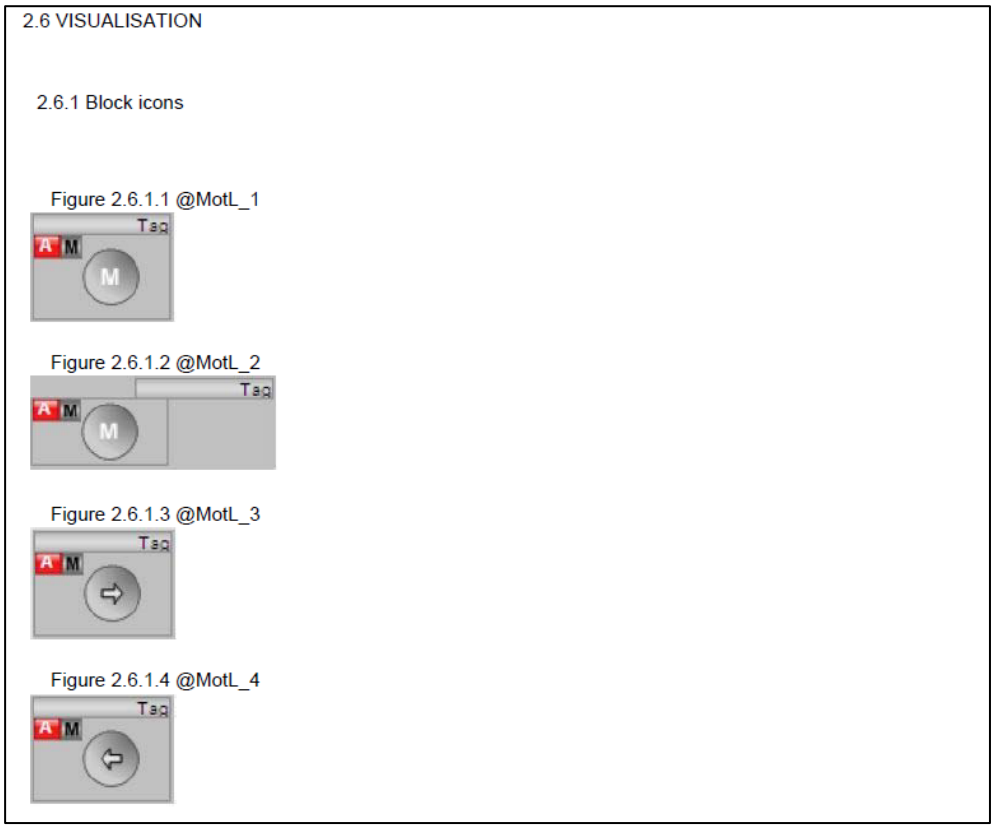
3.2.6 Visualization

In the section "Visualization" you will find an overview of symbols and faceplates (image modules) of the technological module for display on the operator station or a Comfort Panel.

Icons

The subsection "Icons" lists the configurable block icons and the optional panel icon.

Figure 3-14



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Faceplates

The subsection "Faceplates" shows the user interfaces for Operator Station and optional Comfort Panel with their technical and technological functions.

Figure 3-15

2.6.3 Faceplates

Figure 2.6.3.1 MotL - PCS7 - Standard view

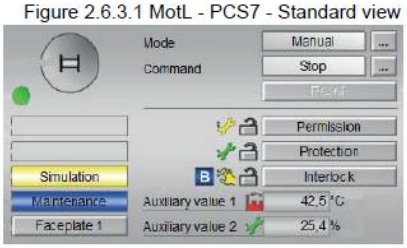


Figure 2.6.3.2 MotL - PCS7 - Preview - Display of the current monitoring time is visible

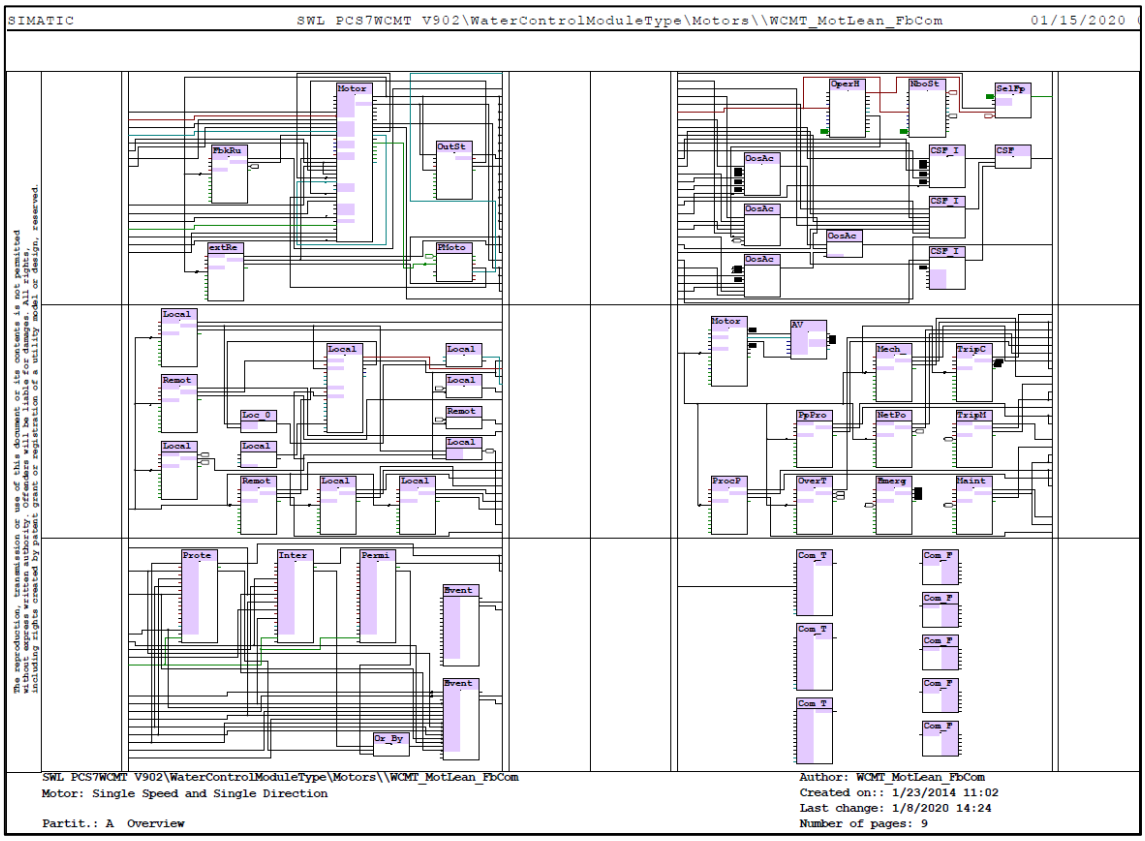


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3.3 CFCs

As an extension of the profile, the CFC plan is shown with all modules and connections.

Figure 3-16: "WCMT_PCS7MotLean_FbMMS02" profile – CFC overview



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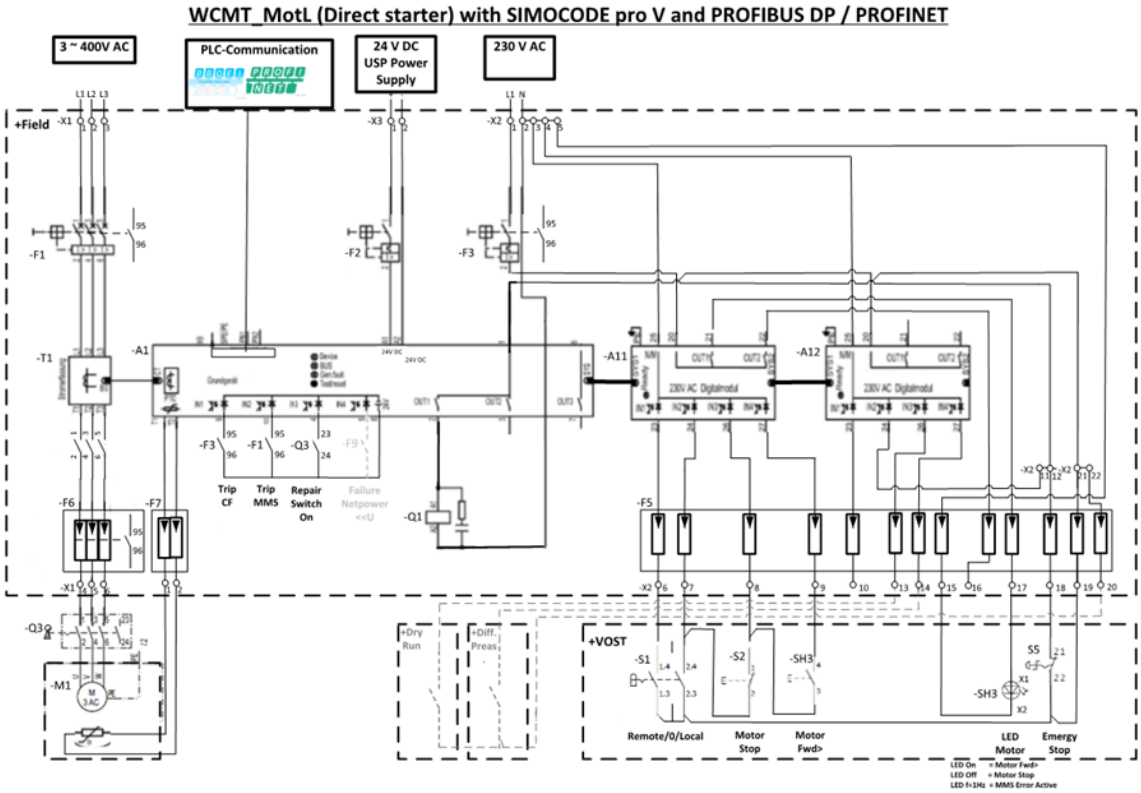
Note All associated individual plans are shown in the S7_WCMT profile following the CFC overview.

4 Circuit Diagrams

Various electrical connection diagrams are available for the SIMOCODE pro V motor management system and for general-purpose drives. Your regional Siemens sales partner will provide you with the circuit diagrams at no charge.

https://w3.siemens.com/aspa_app/?lang=en

Figure 4-1



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5 Installation

5.1 Installed software

The following table provides a unified overview of the use of all software packages, including version statuses. Apart from the standard PCS 7 installation, the licensed ES software packages for Industry Library, TIA Portal, SITRANS Library, SIMOCODE ES (TIA Portal) and STARTER can be added as needed. It is also possible to use the PCS 7 Water Templates without these software packages. In such case, the templates do not contain additional functions, such as Panel blocks from the Industry Library.

Table 5-1

Name	Version	Release	Status
WinCC Advanced Process Control	V7.4 SP1 Upd12	V07.04.20.12_02.06.00.01	K7.4.1.12
CFC	V9.0 SP3 Upd3	09.00.03.03_01.12.00.03	K9.0.3.3
DBA Faceplates	V9.0	09.00.00.00_03.01.00.05	V9.0.0.0
DOCPRO	V9.0 SP3	09.00.03.00_01.40.00.10	K9.0.3.0
IEAPO	V9.0 SP3 Upd3	09.00.03.03_01.12.00.03	K9.0.3.3
SIMATIC IS-Ready	2014 SP3 Update 3	V14.00.03.03_00.00.00.47	K14.0.3.3
Automation License Manager	V6.0 SP3	06.00.03.00_01.01.00.09	K6.0.3.0
PCS 7 PowerControl Faceplates	V9.0 SP1	09.00.01.00_03.01.00.13	K9.0.1.0
SIMATIC PCS 7 Library	V7.1 SP3 Upd4	K07.01.03.04_01.06.00.01	K7.1.3.4
SIMATIC PCS 7 PID Tuner	V8.0 SP1 Upd2	K08.00.01.02_01.03.00.02	K8.0.1.2
SIMATIC PCS 7 Basis Faceplates	V9.0 SP3	09.00.03.00_04.02.00.04	K9.0.3.0
SIMATIC PCS 7 Advanced Process Faceplates	V9.0 SP3	09.00.03.00_06.03.00.01	K9.0.3.0
SIMATIC PCS 7 Advanced Process Library	V9.0 SP3 Upd1	09.00.03.01_01.01.00.01	K9.0.3.1
SIMATIC PCS 7 Basis Library	V9.0 SP3 Upd1	09.00.03.01_01.07.00.01	K9.0.3.1
PCS7MPC	V8.1	V08.01.00.00_01.16.00.01	V8.1.0.0
DBA Common Basis	V9.0 Upd2	09.00.00.02_01.01.00.06	K9.0.0.2
PCS 7 System Documentation ES	V9.0 SP1	V09.00.01.00_01.01.00.23	K9.0.1.0
SIMATIC PCS 7 HSP	V9.0 SP2	V09.00.02.00_29.01.00.01	V09.00.02.00
__SIMATIC PCS 7 EU__	V9.0 SP2	V09.00.02.00_29.01.00.01	---
PCS 7 System Documentation Runtime	V9.0 SP1	V09.00.01.00_01.01.00.23	K9.0.1.0
SIMATIC PCS 7 Tools	V9.0 SP2	09.00.02.00_29.01.00.01	K9.0.2.0
PCS 7 PowerControl Library	V9.0 SP1	09.00.01.00_03.01.00.13	K9.0.1.0
PCS 7 PowerControl Profibus Driver	V9.0 SP1	09.00.01.00_03.01.00.13	K9.0.1.0
PCS 7 PowerControl Profinet	V9.0 SP1	09.00.01.00_03.01.00.13	K9.0.1.0

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Name	Version	Release	Status
Driver			
SIMATIC PDM FF Option	V9.1 Upd4	09.01.00.04_01.06.00.01	K9.1.0.4
S7-PLCSIM	V5.4 SP8	V05.04.08.01_01.24.00.01	K5.4.8.1
PCS 7 PowerControl	V9.0 SP1	09.00.01.00_03.01.00.13	V9.0.1.0
PCS 7 PowerControl Licenses	V9.0	09.00.00.00_04.01.00.05	V9.0.0.0
PCS 7 PowerControl DBA Licenses	V9.0	09.00.00.00_04.01.00.05	V9.0.0.0
PCS 7 PowerControl Docs	V9.0 SP1	09.00.01.00_03.01.00.13	K9.0.1.0
PUDManager - Help Viewer	V1.1 Upd1	V01.01.00.01_01.00.00.18	K1.1.0.1
PV InsInfo-Server	V9.0 SP3	09.00.03.00_01.40.00.10	K9.0.3.0
DBA Runtime Extension Framework	V9.0 Upd1	09.00.00.01_01.01.00.06	K9.0.0.1
DBA Script Engine	V9.0 Upd1	09.00.00.01_01.01.00.06	K9.0.0.1
DBA Runtime Extension Framework Support	V9.0	09.00.00.00_03.01.00.04	V9.0.0.0
SIMATIC Remote Publisher	V7.4 SP1 Upd12	V07.04.20.12_02.06.00.01	K7.4.1.12
AS-OS-Engineering	V9.0 SP3 Upd3	09.00.03.03_01.12.00.03	K9.0.3.3
SIMATIC Modbus/TCP CP Redundant	3.0.0	R3.0.0.0	V3.0.0.0
SIMATIC S7-SCL	V5.6 HF1	K5.6.0.1_2.1.0.1	K5.6.0.1
SIMATIC SFC	V9.0 SP3 Upd1	09.00.03.01_01.15.00.07	K9.0.3.1
SIMATIC SFC Visualization (SFV)	V9.0 SP3 Upd3	09.00.03.03_01.12.00.03	K9.0.3.3
SIMATIC IL PCS 7 Faceplates for PCS7 OS	V9.0 Upd1	09.00.00.01_02.07.00.02	K9.0.0.1
SIMATIC IL PCS 7 Function Blocks as addition for APL	V9.0 Upd1	09.00.00.01_02.07.00.02	K9.0.0.1
SIMATIC NET PC Software	V14 SP1 Upd11	14.00.01.11_51.36.00.01	14.0.1.11
SIMATIC PDM	V9.1 Upd5	09.01.00.05_01.02.00.01	K9.1.0.5
SITOP PCS 7 Application Example (AS)	V3.3	V03.03.00.00_01.00.00.37	V3.3.0.0
SITOP PCS 7 Application Example (OS)	V3.3	V03.03.00.00_01.00.00.37	V3.3.0.0
SL V9.0 SP1 Upd2: PCS 7 Faceplates for PCS7 OS	V9.0 SP1 Upd2	09.00.01.02_01.01.00.30	V9.0.1.2
SL V9.0 SP1 Upd2: PCS 7 Function Blocks	V9.0 SP1 Upd2	09.00.01.02_01.01.00.30	V9.0.1.2
SL V9.0 SP1 Upd2: PCS 7 Drivers	V9.0 SP1 Upd2	09.00.01.02_01.01.00.30	V9.0.1.2
SIMATIC Management Agent	V9.0 SP1	09.00.01.00_00.01.00.11	K9.0.1.0
SIMATIC NET PC Software Doc	V14.0 SP1	V14.00.01.00_51.25.00.01	V14.0.1.0
STEP 7	V5.6 SP1 HF5	K5.6.1.5_7.1.0.1	K5.6.1.5
DBA Channel	V9.0 Upd2	09.00.00.02_01.01.00.03	K9.0.0.2
DBA Base Faceplates	V9.0 Upd1	09.00.00.01_01.01.00.05	K9.0.0.1
TH	V9.0 SP3 Upd1	09.00.03.01_01.15.00.07	K9.0.3.1
Version Cross Manager (VXM)	V9.0 SP3	09.00.03.00_01.40.00.10	K9.0.3.0

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Name	Version	Release	Status
WinCC Runtime	V7.4 SP1 Upd12	V07.04.20.12_02.06.00.01	K7.4.1.12
WinCC Configuration	V7.4 SP1 Upd12	V07.04.20.12_02.06.00.01	K7.4.1.12
WinCC OPC Server	V3.9 SP7 Upd5	03.09.07.05_01.01.00.01	K3.9.7.5
WinCC OPC-UA Client	V1.0 SP1 Upd9	01.00.01.09_01.01.00.01	K1.0.1.9
SIMATIC WinCC Smart Tools	V7.4 SP1	V07.04.20.00_01.32.00.02	K7.4.1.0
XML TRANSFER	V9.0 SP3 Upd3	09.00.03.03_01.12.00.03	K9.0.3.3

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5.2 Dearchiving in SIMATIC Manager

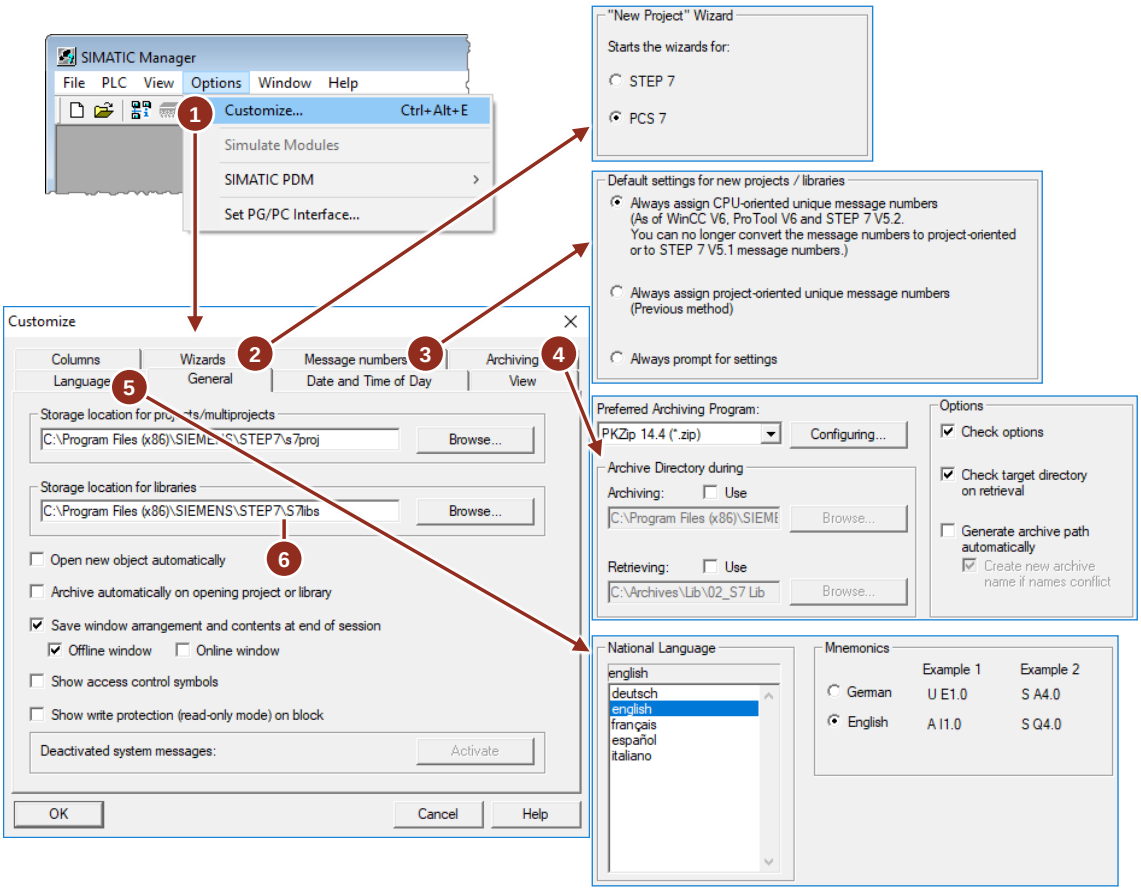
The libraries of the PCS 7 Water Templates, from this application example, can be obtained from your regional contact.

https://www.automation.siemens.com/aspa_app/?lang=de

Dearchive the libraries with the standard function "Dearchive" in SIMATIC Manager.

Make sure you read the project settings below:

Figure 5-1



(1) Open the SIMATIC Manager project settings

(2) Wizard: Activate the wizard for PCS 7

(3) Message numbers: Select the "Always assign CPU-oriented unique message numbers" as the default setting for new projects or libraries.

(4) Archive PCS 7 projects: Choose an archiving program and the storage location for the archived projects.

(5) Language: Select the language for the user interface of SIMATIC Manager and the project display.

(6) Storage location of the PCS 7 Water Templates with the name "Swl_Adv902p7" is stored by default in C:\SIEMENS\Step7\S7lib.

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Note The global settings listed above apply for each PCS 7 project that opens with SIMATIC Manager. To accept these settings, the SIMATIC Manager must be closed and restarted.

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6 Appendix (attachments)

6.1 Glossary

Table 6-1

Term	Explanation
AdvES	Advanced Engineering System
APL	Advanced Process Library (individual control module type library) The PCS 7 AP Library V9.0 SP1 basically contains all blocks and functionalities of the PCS 7 Library V9.0 SP1 and offers additional functionalities as well as completely new blocks. All parameters of the APL blocks are subject to a new naming convention.
TIA	With Totally Integrated Automation™, Siemens offers a universal range of products and systems for the efficient automation of plants in the water industry – whether in water, wastewater, irrigation or desalination.
TIP	Totally Integrated Power™ stands for integrated electrical energy distribution plants for infrastructure, buildings and industry.
Base line library	Since the PCS 7 Library V9.0 and the PCS 7 AP Library V9.0 can be installed either individually or together, the blocks needed together have been moved to the PCS 7 Basic Library V9.0. This consists largely of driver blocks.
Standard Library	The PCS 7 Library V9.0 corresponds to the PCS 7 Library V8.2.
CFC	Continuous Function Chart A higher graphic language with function blocks for configuring continuous control systems.
Chart	The document in which the automation functions can be created with the CFC Editor or the SFC Editor.
CSV	Comma Separated Value ASCII text format for storing table data.
Faceplate	Standard operating screen A graphic element on the screen of the operator station which represents, for instance, an analogue control instrument, a hardwired pushbutton or a switch and enables the operator to monitor and operate the device.
Function block	A control module as defined in IEC 1131-3. See also "Block".
Instance	A copy of a function block, which is reused for the control configuration of a similar application.
Communication connection	The hardware and software for the transmission and reception of analogue and digital information via a communication system such as, for instance, a bus.
Module (assembly, block)	A group of interconnected components that constitute a recognizable device, instrument or equipment item. An assembly can be switched off, removed as a complete unit and replaced with a spare part. It has definable performance characteristics which permit its examination as a unit.
Mode/operating mode	Operating condition of control modules such as Manual, Automatic or Cascade.

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Term	Explanation
Operator Station (OS)	Electronic equipment that carries the man-machine interface, which includes at least a monitor, a keyboard and a pointing device and is used by at least one operator to monitor and operate the assigned process or the manufacturing units assigned to him.
PROFIBUS (Process Field Bus)	Field bus according to EN 50170 Vol. 2 PROFIBUS (DIN 19245; bus system for industrial application based on PROFIBUS).
Plug and play	The ability of hardware devices to identify themselves automatically to the system. If the device is switched on, it is automatically assigned a unique identifier, without the need for DIP switches to be set.
Process object (PO)	A collection of tags and parameters that runs a controller/function module (e.g. engine, check valve, PID controller), which may consist of more than one I/O point.
Protocols	Output of information in normalized representation; e.g. as a print-out, a screen display or a file.
Redundant	A system/subsystem with two modules that perform an automatic switchover (alternate circuit) without loss of system function when an error occurs.
Control (regulatory control)	The functions of process measurement, execution of control algorithms and control of a device actuator which enable the automatic control of a plant process.
Security	System access control by means of a key lock, password, electronic card or equivalent method.
SFC	Sequential Function Chart A higher graphical configuration language for sequential control applications.
PLC	Programmable Logic Controller Used for discrete and continuous control in processing and manufacturing facilities.
System bus	The network, used for communication between controllers and HMI Servers.
Tag	A collection of attributes that specifies a control loop, a process tag, a measured input, a calculated value or a combination thereof, as well as all its control/closed-loop control and output algorithms. Each tag is unique.
Tag ID	The unique alphanumeric code assigned to inputs, outputs, device positions and control modules. The tag ID can contain the plant area identifier
Terminal bus	The network for communication between HMI clients and HMI servers.
Availability	The probability that a system can perform an intended function when required.
Reliability	The probability that the system or component fulfills its intended use for a defined period, usually measured as "Mean Time Between Failures" (MTBF).

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6.2 Service and support

Industry Online Support

Do you have any questions or need assistance?

Siemens Industry Online Support offers round the clock access to our entire service and support know-how and portfolio.

The Industry Online Support is the central address for information about our products, solutions and services.

Product information, manuals, downloads, FAQs, application examples and videos – all information is accessible with just a few mouse clicks:
support.industry.siemens.com

Technical Support

The Technical Support of Siemens Industry provides you fast and competent support regarding all technical queries with numerous tailor-made offers – ranging from basic support to individual support contracts. Please send queries to Technical Support via Web form:
www.siemens.com/industry/supportrequest

SITRAIN – Training for Industry

We support you with our globally available training courses for industry with practical experience, innovative learning methods and a concept that's tailored to the customer's specific needs.

For more information on our offered trainings and courses, as well as their locations and dates, refer to our web page:
www.siemens.com/sitrain

Service offer

Our range of services includes the following:

- Plant data services
- Spare parts services
- Repair services
- On-site and maintenance services
- Retrofitting and modernization services
- Service programs and contracts

You can find detailed information on our range of services in the service catalog web page:
support.industry.siemens.com/cs/sc

Industry Online Support app

You will receive optimum support wherever you are with the "Siemens Industry Online Support" app. The app is available for Apple iOS, Android and Windows Phone:
support.industry.siemens.com/cs/ww/en/sc/2067

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6.3 Links and literature

Table 6-2

No.	Subject
\1\	Siemens Industry Online Support https://support.industry.siemens.com
\2\	Link to the article page of the Application Example https://support.industry.siemens.com/cs/ww/en/view/78604785
\3\	SIMATIC PCS 7 V9.0 – Room for new perspectives https://new.siemens.com/global/en/products/automation/distributed-control-system/simatic-pcs-7.html
\4\	SIMATIC PCS 7 technical documentation https://new.siemens.com/global/en/products/automation/distributed-control-system/simatic-pcs-7/technical-documentation.html
\5\	SIMATIC PCS 7 Online Support (Overview) https://support.industry.siemens.com/cs/ww/en/view/63481413
\6\	SIMATIC PCS 7 V9.0 SP1 – Licenses and quantity structures https://support.industry.siemens.com/cs/ww/en/view/109754986
\7\	ProTime offer tool - Calculation for a PCS 7 system https://new.siemens.com/global/en.html#ProTime
\8\	SIMATIC Process control system PCS 7 Advanced Process Library Readme V9.0 SP1 Update 2 (Online) https://support.industry.siemens.com/cs/ww/en/view/109757947
\9\	SIMATIC PCS 7 Library V7.1 SP3 Upd4 https://support.industry.siemens.com/cs/ww/en/view/109756832
\10\	Sales and Delivery Release: SIMATIC PCS 7 Industry Library V9.0 https://support.industry.siemens.com/cs/ww/en/view/109750720
\11\	Manual for SIMATIC PCS 7 Industry Library V9.0 https://support.industry.siemens.com/cs/de/en/view/109738716
\12\	SIMATIC PCS 7 Condition Monitoring Library V9.0 https://support.industry.siemens.com/cs/de/en/view/109751047
\13\	Sales and Delivery Release: SIMATIC PCS 7 TeleControl V9.0 https://support.industry.siemens.com/cs/ww/en/view/109750089
\14\	Integrated engineering based on COMOS with SIMATIC PCS 7 and SIMIT simulation https://support.industry.siemens.com/cs/ww/en/view/56731718
\15\	SITRANS Library https://w3.siemens.com/mcms/sensor-systems/de/messumformer/kommunikation-und-software/Seiten/SITRANS-Library.aspx
\16\	Project planning of frequency converters with the APL channel module "FbDrive" in SIMATIC PCS 7 https://support.industry.siemens.com/cs/ww/en/view/64181993
\17\	Configuration of Direct Starters with the APL Channel Block "FbSwtMMS" in SIMATIC PCS 7 https://support.industry.siemens.com/cs/ww/en/view/64182525
\18\	Manual Collection - SIMOCODE pro https://support.industry.siemens.com/cs/ww/en/view/109743951
\19\	MAG 5000/6000 Operating Instructions https://support.industry.siemens.com/cs/ww/en/view/85671888

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No.	Subject
\20\	Configuration of SINAMICS and MICROMASTER drives with Drive ES in PCS 7 https://support.industry.siemens.com/cs/ww/en/view/58007228
\22\	All-round protection with Industrial Security - Plant Security https://support.industry.siemens.com/cs/ww/en/view/50203404
\24\	Application Description for 3-way control via SIMOCODE https://support.industry.siemens.com/cs/ww/en/view/61026729
\25\	Working Templates for Specifying Technical Functions with SFC Types in SIMATIC PCS 7 https://support.industry.siemens.com/cs/ww/en/view/33412955
\26\	Integration of Comfort Panels, Operator Panels and S7-300 Package Units in SIMATIC PCS 7 with PCS 7 Industry Library https://support.industry.siemens.com/cs/ww/en/view/50708061
\27\	Software for integration of the SITRANS product family in SIMATIC https://support.industry.siemens.com/cs/ww/en/view/65741624
\28\	System libraries http://w3.siemens.com/mcms/process-control-systems/en/simatic-pcs-7/simatic-pcs-7-systemkomponenten/Systembibliotheken/Pages/Systembibliotheken.aspx
\29\	PROFIBUS PA/DP Communication Modules Operating Instructions https://support.industry.siemens.com/cs/ww/en/view/109739262
\30\	Automating with STEP 7 in AWL and SCL Author: Hans Berger Publicis MCD Publisher ISBN: 978-3-89578-397-5
\31\	Process Control System Engineering Author: Leon Urbas Oldenburg Industrial publishing house ISBN: 978-3-8356-3198-4

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6.4 Change documentation

Table 6-3

Version	Date	Modifications
V1.0	11/2017	First edition
V2.0	10/2018	Update to SIMATIC PCS 7 V9.0 SP1
V3.0	05/2020	Update to SIMATIC PCS 7 V9.0 SP2